RAILROAD GAZETTE

FRIDAY, JUNE 29, 1894.

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The office of the Railroad Gazette is now at 32 PARK PLACE, New York.

The Flood Damages in Colorado.

CAÑON CITY, Col., June 21, 1894.

TO THE EDITOR OF THE RAILROAD GAZETTE:

It is a difficult matter to estimate in dollars and cents the amount of damage done to the railroads properties of Colorado by the recent floods.

On the line of the Denver & Rio Grande Railroad, with the exception of the 6-mile Manitou branch, the affected district was confined almost wholly to the 32-mile stretch from Pueblo to Florence. Between these points the line skirts the Arkansas river, and here the damage was greatest. Never before, since Colorado was settled, has this usually inoffensive stream so demonstrated its power. A rise of at least 8 feet carried it out of its regular channel, crossing the tracks and making for itself a temporary course far around by the base of the lime stone bluffs which define the valley. A ride over the line to-day disclosed the fact that superhuman energy upon the part of the Denver & Rio Grande officials has opened the line after but a week's blockade, and while it will require the expenditure of many thousands of dollars to restore the roadbed to its former high-class condition, botn freight and passenger trains are already moving regularly.

The Cañon City branch of the Atchison, Topeka & Santa Fe, which parallels the line of the Denver & Rio Grande between Pueblo and Cañon City, on the opposite side of the river, was less fortunate. In the construction of this line, the course of the river was changed in many places, and the high water, reasserting its rights, carried out many stretches of track, varying from 300 feet to 1000 feet in length. It will require the employment of a large number of men, working night and day for at least a month, to reopen this line. As the Santa Fe has large and important coal properties near Cañon, work will undoubtedly be pushed with all possible vigor. No bridges of any magnitude were lost by either line.

Within the city limits of Pueblo, the damage to property was very great. The Union Depot yards and waiting room were four feet under water, and an approach, 600 feet long, to the bridge of the Union Pacific, Denver & Gulf was carried away, and the bridge proper strained and weakened to such an extent that a temporary trestle is now used in its stead. This line also suffered severely between Golden and Georgetown, on the line to the famous "Loop," all traffic being discontinued between these points for about ten days. Again, at Boulder, the waters caused serious delays, but, taken as a whole, the damage throughout the State is of a nature which, with the exception of the Santa Fe branch referred to, will not require serious outlays to repair. The newly-opened Florence & Cripple Creek Railroad was one of the heaviest losers, but work was prosecuted with wonderful vigor, and the road is again open. In a word, the damage to the railroads of Colorado, while serious, is far less so than the newspaper reports would lead one to believe, and is, in nearly every instance, of a nature which can be overcome without any disastrous expenditure.

It would certainly seem that this flood was sent to fill Colorado's cup to the brim. The demonetization of silver; the election of our "blood-to-the-bridles" Governor, of whom the kindest thing we can say is to brand him a lunatic of the first water; the many failures of savings and national banks last Summer; the consequent depreciation in real estate values; the advent of thousands of Coxeyites at the invitation of our mad Executive, and his support of the lawless striking miners at Cripple Creek, all form a chapter which is now, we hope and pray, brought to a fittingly tragic close by the rush of waters. Colorado has suffered far beyond her just measure within the past two years, but her business men, while laboring under a terrible strain, have never lost heart, and will yet restore her to not only her former high rank among her sister States, but by the development of her newly discovered gold fields place her fairly in the van. "Gold and irrigation" is the war cry to-day, and with the assured defeat of the Populist party this Fall, thus doing away with all fear of "crank" legislation, an unexampled period of prosperity and development is assured.

D. J. FLYNN.

Convention of the American Society of Civil Engineers.

The twenty-sixth annual convention of the American Society of Civil Engineers was held at Niagara Falls, beginning on Wednesday morning of last week and ending Monday evening of this week. In many respects this is thought to have been the best convention that the Society ever held. The attendance was probably larger than ever before. On Friday the number of members and their friends present had reached about 350, and it is probable that nearly 400 people were there, first and last, although not so many were present at any one time. The weather was as favorable as could have been expected. Although the thermometer stood very high, there was always a fresh breeze, and in the shade life was pleasant; and the magnificent natural spectacle of the falls, the rapids, the gorge and the whirlpool was as impressive as possible under the brilliant sunlight. Many of the oldest and most distinguished members of the Society were present, including six past presidents, among whom General Greene, in his 94th year, appeared as one of the most vigorous.

A large party went from New York and Philadelphia by a special train furnished by the Lehigh Valley. Probably as many as 200 persons went in that way.

In the sessions of Wednesday 12 papers were presented. Naturally, they could not have been read at length, nor was there very much discussion on them, although some of it was animated. In the evening session, Colonel William P. Craighill, Corps of Engineers, U. S. A., President of the Society, delivered his annual address, an abstract of which follows.

PRESIDENT'S ADDRESS.

Colonel Craighill took as his topic, "Our National Defenses," and at the outset referred to some erroneous ideas which have prevailed, and still prevail, among many of our people. When the Civil War came on our sea coast defenses were admitted to be as good as any in the world. In one great particular they were better than those of any other people—that was the Totten embrasure. In a casemated battery built for the defense of a great European port just before the introduction of the Totten embrasure here, the opening in the wall of the embrasure was 54 square feet, and the horizontal traverse of the gun was only 40 degrees. The Totten embrasure gave an opening of only 9 square feet, and gave a horizontal traverse of 60 degrees. The wall around the throat of this embrasure was strengthened by wrought iron a foot thick, inserted in the masonry, and lead concrete was also used as a most excellent material for resisting the impact of shot. Wrought iron shutters were added, which closed automatically, were thick enough to exclude grape shot, and kept out the smoke of the discharge. This invention of General Totten, who was then Chief of Engineers of the Army, is of historic interest as the first instance of the use of iron plating on land batteries. Some of these old forts are still of value, but not to be entirely depended upon for the defense of our harbors.

A very important part of our present system of defense consists of torpedoes, but these must be under the fire of guns on land, in order that the enemy cannot remove or disable them. The light craft which would be used by a fleet for this purpose would be vulnerable to the fire of such guns as will still be accommodated in the Totten embrasure. Great ironclads must be met by the heaviest guns and mortars, mounted behind impenetrable, covered masses, and made as safe as possible by all the modern improvements, but it would be a waste of energy and money to fight the smaller craft with these largest guns.

Some historical incidents were introduced to show the value of small guns, to be used at comparatively short range, and to show the defensive power of forts of even moderate strength. The attack of the British on Baltimore in 1812, and the experiences of Fort Sumter during our war, were introduced for this purpose. Invulnerability is not to be aimed at in constructing land defenses, but relative vulnerability and endurance, and here the advantage will always be on the side of the defense; and guns of a given power can be mounted cheaper on land than on water, and will have the advantage in stability and accuracy of fire.

No armor has yet been produced that can properly be called invulnerable, and it is safe to say that none such ever will be produced; and, unless the decks of ships are as heavily plated as their sides, they will be penetrable by shells from rifled mortars, the accuracy of which has recently been greatly improved.

It is often said, and especially by people in the interior, who themselves are not directly subject to attack, that no enemy would undertake to land an army on our shores, as our militia would rise and drive the invaders into the ocean. It is true that our people are brave, and, under discipline and with experience, make as good soldiers as any in the world, but in attempting to prevent a descent upon the coast they could make no prolonged resistance to the big guns of an invading fleet. The more the men who lined the shores, even with the best rifles and field artillery, the greater would be the slaughter. Some fixed defenses must be provided for our great cities and harbors. Reliance upon torpedoes alone is mistaken, for torpedoes may be taken up as easily as they can be put down, unless they are placed under fire from the shore—that is, they are only an adjunct to defense. Neither is it the best economy to mount our guns for harbor defense solely upon ships. This would require at every point to be defended a fleet as strong as the enemy could be expected to bring against it, and the first cost of mounting guns ashore is far less than putting them on ships, and the life of shore fortifications is longer than the life of ships. It would take a navy greater than that of all the other nations of the world combined to defend the immense coast line of the United States.

In 1816 the Board of Engineers laid down the following principles for the defense of our coast:

1. They must close all important harbors against an enemy, and secure them to our military and commercial marine.

2. They must deprive an enemy of all strong positions, where, protected by naval superiority, he might fix permanent quarters in our territory, maintain himself during the war, and keep the whole frontier in perpetual alarm.

3. They must cover the great cities from attack.

4. They must prevent, as far as practicable, the great avenues of interior navigation from being blockaded at their entrance into the ocean.

5. They must cover the coastwise and interior navigation, by closing the harbors and the several inlets from the sea which intersect the lines of communication, and thereby further aid the navy in protecting the navigation of the country.

6. They must protect the great naval establishments.

These principles are fundamental, and have stood the test of argument and experience, but the means of carrying the principles out have changed, and now it is necessary to concentrate at the points to be defended armaments equal in weight and metal to those of any possible attacking fleet, supplemented by torpedo defense.

Another important element in our defensive system is the ship canal, and an interior line of waterway, parallel to the Atlantic and Gulf Coasts, is of great importance. It would be useful in peace, and in time of war its advantage to our naval and merchant marine would be incalculable. For instance, a ship canal connecting the great bays of the Chesapeake and the Delaware would enable a single fleet to be prepared to promptly meet an enemy threatening either of these waters. A great canal should connect the lakes with the Mississippi, and the Erie Canal should be made wider and deeper; but, most important of all, is a canal across the Isthmus, between the Atlantic and Pacific Coasts. The immense commercial and military advantages to be gained from the building of such a canal should be controlled by the United States, and it is certain that the Nicaragua Canal will be opened before many years have passed, if not by the United States, by England or by Germany.

The address of the President was followed by a description of the works of the Cataract Construction Co., illustrated by stereopticon views, and read by Mr. William A. Brackenridge, Chairman of the Local Committee of Arrangements.

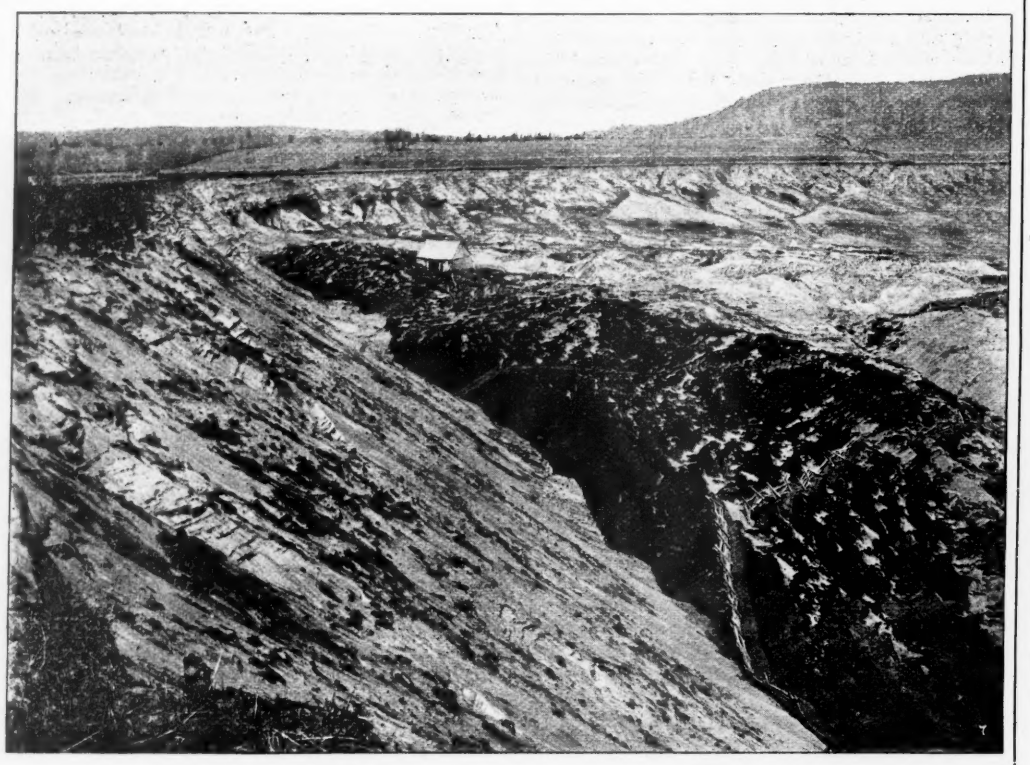
On Thursday morning other papers were read and discussed, and in the afternoon an excursion was made over the Canadian Electric Railway, by invitation of Mr. Osler, President of the Niagara Falls Park & River Railway Co., and under the escort of Mr. Jennings, Member of the Society, Chief Engineer. This railroad operates 14 miles of double track from Queenstown to Chippewa, above the Falls. It is an interesting construction, having on limited parts of the line maximum gradients of 5.7 per cent., and curves of 100 ft. radius. It is built to standard gage, with 56-lb. rail, stone ballasted, and well provided with guard rails on the curves. On three short sections between Queenstown Heights and the wharf there is a descent of 330 ft. in 7,250 ft. linear distance. The line is wired for 31 motor cars of 15 tons each, and the rolling stock is excellent. The excursion over this line included visits to the power houses, and many of the party returned by the New York Central & Hudson River Railroad, on the American side, crossing the river from Queenstown to Lewiston. The Falls power house has three Thomson-Houston multi-polar dynamos, of 200 kilowatts each. At Queenstown there is an auxiliary plant of 268 kilowatts run by steam power, supplying current to the high-grade section bordering Queenstown Heights. This is found more economical than transmitting the large excess volume an hour or two daily from the Falls power house, 9½ miles distant.

In the evening of Thursday a meeting of the Board of Directors was held, at which 23 members of the Board were present, perhaps the largest attendance ever known; otherwise there was no appointment for the evening.

Friday was given up to a most interesting series of visits to the hydraulic enterprises above Niagara. The first visit was to the new works of the Niagara Falls Power Co., a brief description of which was furnished in print for the benefit of the visitors, and some particulars may profitably be repeated here.

The supply canal leaves the Niagara River about 7,000 ft. above the Falls. It is 188 ft. wide and 12 ft. deep, with cut stone walls. From this canal water passes by gates and penstocks to the turbines. At present the wheel pit is constructed only on the western side of the canal. This pit is 21 ft. wide, 179 ft. deep and 150 ft. long, and the turbines are now being placed in the northern end of it. The penstocks which supply the turbines

are 7½ ft. in diameter, and the turbines themselves, each of which is double, take the water at the center and discharge outwardly. These are 5 ft. 3 in. in diameter, and each double turbine will develop 5,000 horse-power. The shaft from the turbines is of hollow steel, 38 in. in diameter and ⅜ of an inch thick. At bearings, the shaft is solid and 11 in. in diameter. The turbines are so arranged that the weight of shafts, turbines and gear is counterbalanced by the upward thrust of the water, so that when running the thrust will be on the bearings at the top. These are to run at 250 revolutions a minute. The breadth from the surface of the water in the canal to a point half-way between the two double turbines is 136 ft. The tail race is a tunnel 7,000 ft. long, 21 ft. high, 18 ft. 10 in. wide, lined throughout with brick. It has a fall of 52½ feet, and opens at the bottom of the gorge, just below the upper Suspension Bridge, at the level of the stream.



St. Alban Landslide.
West end looking from C to D on plan.

In connection with this enterprise is the land enterprise of the Niagara Development Co. and the Niagara Junction Railway Co. The Junction Railroad has been built to connect the lands of the company with the railroad lines reaching Niagara. The development company has laid out a model village called Echota, designed for the housing of families of the work people. The land here has been thoroughly drained, and the drainage water is carried to a well, and, for the present, pumped to the river. Apart from the drainage system is a complete sewage system, with disposal works, where the sewages will be treated chemically. The streets are macadamized, and a number of very good houses have been built, which are provided with water, sanitary conveniences and electric light. The company has also built a store, an assembly room and a railroad station.

After the visit to the new power plant, the party was taken to the water front to examine the facilities for docks and railroad connections, past the buildings of the Pittsburg Reduction Co., under construction, and thence to the Echota village, where lunch was served by the Cataract Construction Co. Thence the party went to the mills of the Niagara Falls Paper Co., where it was received by the General Manager, Mr. J. C. Morgan.

The Niagara Falls Paper Co. has an interesting power plant, consisting of three Geylin-Jonval turbines, each 58 in. in diameter, running 260 revolutions a minute under a head of 144 ft., and each developing 1,100 horse power. The water is taken by a head race to the wheel pit, which is 300 ft. long and 30 ft. wide, and delivered to the turbines through penstocks 13 ft. 6 in. in diameter. The head race, wheel pit and branch tunnel are large enough for 7,000 horse power. The mills, which are said to contain the largest paper machines in the world, have a capacity of 60 tons of finished paper per day; the paper is made entirely of wood pulp, which is ground on the premises. One of the machines makes paper 136 in. wide. The mills also have a steam plant of 925 horse-power used for heating and for power.

From the mills of the paper company some of the party went to the works of the Niagara Falls Hydraulic Power & Manufacturing Co., and to the milling district, where about 10,000 horse-power of water power is in use, one pulp mill using 2,500 horse-power.

Saturday morning a business meeting was held, at which the Nominating Committee was elected as follows:

First District, Clemens Herschel.
Second District, Emil Kuichling.
Third District, John R. Freeman.
Fourth District, C. M. Bolton.
Fifth District, Virgil G. Bogue.
Sixth District, John W. Kendrick.
Seventh District, T. M. R. Talcott.

AMENDMENTS TO THE CONSTITUTION.

At this meeting the amendments to the constitution were also taken up. All of the amendments, the object of which is to take out of the present constitution the provision for the class of subscribers (a class which has never existed) were passed to letter ballot, as was also an amendment making one or two verbal changes, and what is perhaps the most important amendment of all proposed, namely, that providing that the Secretary shall be appointed annually by the Board of Direction.

The other important amendment, providing for a change in the nominating machinery such as would put it in the hands of the Board of Direction, was submitted to a committee, as was a plan proposed by Mr. Morison for an entirely different way of making nominations. At this meeting the usual complimentary resolutions were passed.

In the afternoon the final session of the convention, for presentation and discussion of papers, was held. At this meeting, Mr. Fitzgerald, from the Committee on Badges, reported a recommendation that a badge similar in shape to that now worn, somewhat longer and narrower, however and retaining the same colors, should be adopted, but bearing no device. On it should appear simply the words, "American Society of Civil Engineers, founded 1852." This report was accepted for letter ballot.

In the evening a reception was held, with dancing, and this was very largely attended, some 250 tickets or more having been issued.

Sunday was spent at the hotel, and on Monday a very large party, probably as many as 250, went to Toronto to attend a garden party at the house of Colonel Sir Casimir Gzowski. The Niagara Navigation Co., through Mr. John Foy, General Manager, offered free transportation by any of its steamers for members and guests between Lewiston and Toronto, and the New York Central & Hudson River Railroad and the Grand Trunk also furnished transportation for those who chose to go by rail.

Tuesday the party broke up, about over 100 returning East by the Lehigh Valley special train.

PAPERS READ AT THE CONVENTION OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS,

The Quality of Water Supplies.
By John W. Hill, M. Am. Soc. C. E.

Chautauqua, N. Y., Sewage Disposal Works.
By William B. Landreth, M. Am. Soc. C. E.

Sandrock Sewers in St. Paul, Minn.
By George L. Wilson, M. Am. Soc. C. E.

Hoisting Apparatus of the Canal Head Gates at Sewells Falls, N. H.
By John R. Freeman, M. Am. Soc. C. E.

Notes on Wire Rope Tramways.
By A. C. Savage, M. Am. Soc. C. E.

The Cippoletti Trapezoidal Weir.
By A. D. Flinn and C. W. D. Dyer.

The Pulp Mill of the Cliff Paper Co., at Niagara Falls.
By W. C. Johnson, M. Am. Soc. C. E.

The Niagara Gorge.
By L. L. Buck, M. Am. Soc. C. E.

Railroad Signaling.
By John P. O'Donnell, M. Am. Soc. C. E.

On Form of Railway Excavations and Embankments.
By D. J. Whittemore, M. Am. Soc. C. E.

Brafford's Ridge Tunnel.
By Chas. W. Staniford, M. Am. Soc. C. E.

Tequixquiac Tunnel, Valley of Mexico.
By Albert Johnstone Campbell and Frederick William Abbott, Assoc. M. Inst. C. E.

Steam and Electric Cable-Ways for Logging and Canal-Boat Towing.
By Richard Lamb, Assoc. M. Am. Soc. C. E.

Friction Rollers.
By C. L. Crandall, M. Am. Soc. C. E., and A. Marston, Assoc. M. Am. Soc. C. E.

The Load Line in Telephone Exchanges.
By A. V. Abbott, Jun. Am. Soc. C. E.

Removal of Rock to a Grade of 35 ft. below Mean Low Water
By J. A. Bensel, M. Am. Soc. C. E.

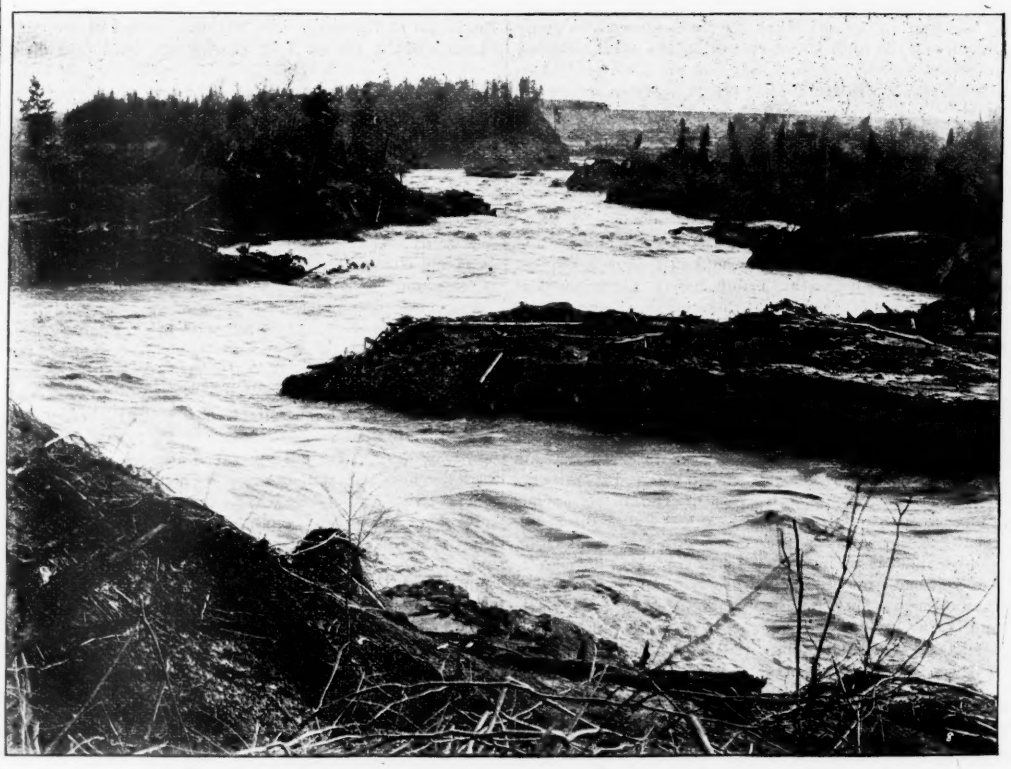
On Testing of Building Stones.
By F. Lynwood Garrison, Assoc. M. Am. Soc. C. E.

On the Marking of Street Lines.
By C. M. Broomall, Jun. Am. Soc. C. E.

Tests of Condensation in Cast-Iron Radiators.
By Wm. J. Baldwin, M. Am. Soc. C. E.

The St. Alban Landslide, Near Quebec.

On the 27th of April last, one of the most extensive landslides ever recorded, occurred on the St. Anne river, near the village of St. Alban, 40 miles west of the City of Quebec. For 20 miles north of the St. Lawrence river, the land rises gently to the base of the Laurentian Mountains. The surface soil is sandy, underlain by clay in horizontal layers. These layers separate readily and dissolve easily in water. At the St. Lawrence the clay is quite soft, but becomes harder further inland. Near the base of the mountains, the clay again becomes soft and is overlain by sand of different depths. The whole plain between the St. Lawrence and the mountains appears to have been at one time a sea or lake bottom.



St. Alban Landslide.
View from the north showing new bed of river above Gorrie Falls, looking south from F on plan.

Referring to the plan, it will be seen that at the south end of the landslide, the sand bank is 175 feet high and rests upon clay. To the north and west, for 3½ miles, the clay rises gradually to within 10 feet of the surface, where it meets the sand. This 10 feet depth of sand is maintained along the north end of the break, and south as far as the "horseback hill." Between this hill and the old channel, and south along the left bank of the river to the south end of the break, the sand bank was 200 to 250 feet high, resting on clay about level with the water, so that the surface of the clay was inclined toward the river, at, and south of the line A-B on plan (see page 460). In the old river-bed, east of the "horseback," the water fell over a granite ridge 105 feet high. At the foot of the fall stood the Gorrie mill (see section page 460). The desolated area is about 3½ miles long by 1 mile wide, and the depression is, on an average, about 100 feet below the general surface.

The greater part of the catastrophe happened in the night, so that it is impossible to give a strictly correct account of it. The melting on the mountains of the excessive snow-fall of the Winter, caused an unusual rise of water in the river. The northern part of the land was forest, and it is supposed that early in the evening the shaded portion, shown at the top of the plan, first slid into the river and completely blocked the channel. This was probably clay sliding on clay, along a plane where water had percolated either from springs, from the brooks which flowed into the river near this point, or from the river itself. The water of the river was then dammed back for 2½ miles in length by ¼ of a mile in width. The surface of the water was raised about 100 feet until it gathered sufficient force to burst the barrier, when it swept down southwards, carrying with it both clay and sand; together with the forest trees, which were prostrated before the torrent as easily as a field of grain. This stream, No 1, crossed the old river bed and ran straight to the old channel at Sand Point. While this was being done, all the land east of channel No. 1 was sliding into the old river bed and filling it up. Banks were falling in all directions with a sound resembling the roar of artillery, one crash succeeding another. Forest trees rocked and plunged headlong into the flood. The water was thrown into the air in clouds of spray. The shocks were distinctly felt for 7 miles and the sound was heard at a distance of 10 miles. The waterfall, 105 feet high, at the Gorrie mill was buried 50 feet deep, and the pulp-mill, two houses and a barn at the foot of the falls, were buried 80 feet deep, by the "horseback hill," which had moved 450 feet, clay sliding on clay. The area of this hill is about 50 square acres, and it was moved bodily without disturbing any of the trees which grew upon it.

Channel No. 2 now branched off from channel No. 1, and ran southeast, curving to the northeast and joining channel No. 1 where it crossed the old river bed. As the land between these two channels suddenly slid to the east and sank into the roaring flood, a terrific scene of desolation was presented. The Gauthier house and its four occupants were engulfed. The water, rising against the bank in the south curve of channel No. 2, saturated the sand back, southwest, for half a mile; the surface of the clay then being lubricated, the whole half mile of sand bank 175 feet high, began moving southeast, carrying with it houses, barns, cattle and people. The latter, repeating their prayers in the full belief that the end of all things had come, fled for their lives, dragging their children in the darkness through water waist-deep.

In some places the earth was moving faster than the people could run in the opposite direction, so that more than once they were drawn back into deeper water and almost lost. All escaped, however, except two women and nine children who were cut off by the water and isolated on a small island where they spent the night. They succeeded in kindling a fire, around which they huddled, expecting every moment to be their last on earth, until the morning dawned, when they were rescued and taken off in a boat.

The water was converted into a mass of quicksand on which large trees were borne upright. Heaps of dry sand fell on this semi-fluid mass of sand and clay with loud noise, and the moving mass of mud and forest was carried away toward the sea, destroying every highway bridge in its path. A house, several acres of land and some ornamental trees were carried bodily three-quarters of a mile before any injury was done to them.

Lastly, channel No. 3 was opened, and now runs 70 feet vertically above the original river bed south of the "horseback" hill.

At the bottom of the sunken area lie fragments of the original surface thrown together in the wildest confusion. The water is still charged with as large a quantity of clay and sand as it can hold in suspension. It is quite probable that future floods will cause the river to traverse this sunken area from side to side, and likely cut away the sand point now projecting out at the southeast corner. Fifteen days after the landslide, a dam of driftwood was formed almost across the river near the Village of Ste. Anne de la Pérade, causing the current to undermine the concave bank, with the result that a piece of land 180 feet wide and 1,600 feet long fell into the steam, carrying with it five houses and endangering the whole village.

The Canadian Pacific Railway bridge, over the Ste. Anne river—a fine iron structure on substantial stone piers—was for several days in great danger. The District Superintendent and Resident Engineer were on the spot with a steam pile-driver and 100 cars of material ready for any emergency. Fortunately the bridge sustained no serious damage.

St. Alban Landslide.

Looking northeast from G on Plan.

St. Alban Landslide.

View from the west, looking north from J on Plan.

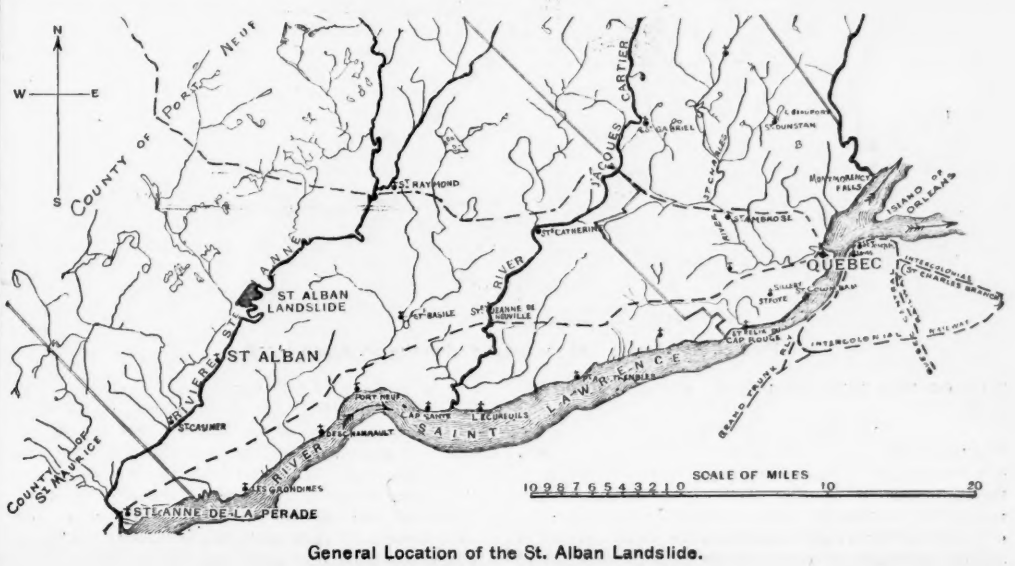
The Master Mechanics' Convention.

We continue from page 445 our report of the 27th Convention of the Master Mechanics' Association.

The report of the Committee on

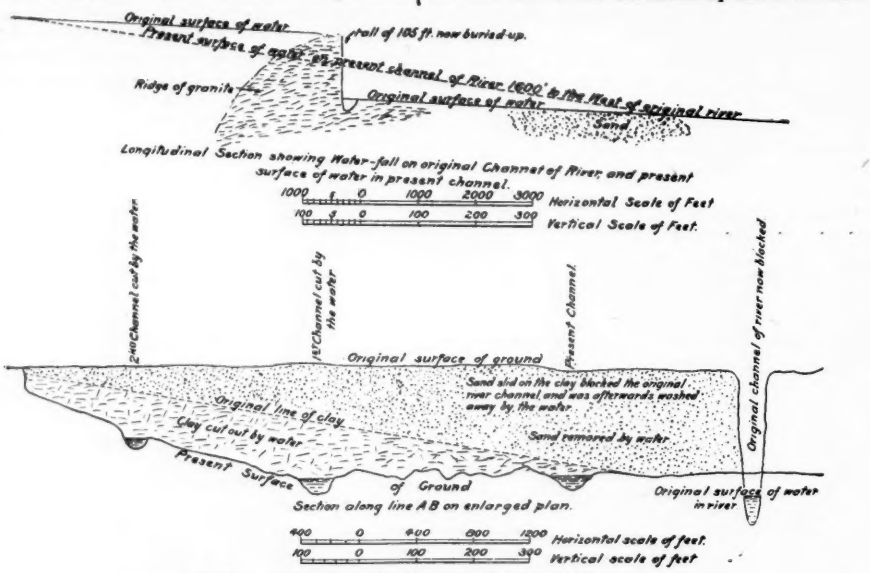
LOCOMOTIVE FIRE KINDLERS

was read by Mr. Hill of the Committee. The report formulated the conditions under which an oil kindler could be successfully used, namely, no oil must be stored in the building, there must be no gravity flow toward the building, only so much oil must be brought into a building as is needed at once, and the surplus must be immediately removed, the burner must be easy to handle, there must be no possibility of leaving the supply on by accident, and finally, it must be cheaper and better than the system at present in use. There has been for some time an effort to supply the demand for a good oil system, and this appears to have been done in the Leslie system now in use at the Chicago roundhouse of the Rock Island, the Cedar Rapids shops of the Burlington & Northern, and in some other places. This device is fully described elsewhere in



General Location of the St. Alban Landslide.

this issue of the *Railroad Gazette*. The experience at the Chicago roundhouse shows that on the first tank of oil the saving was nearly enough to install the complete plant for that roundhouse which contains 35 engine stalls. Seven other roundhouses have recently been equipped by the company, making 185 stalls. In tests to determine the difference of time required to get a given pressure there was not much saving by the oil-kindled fire, although this always got the pressure first; but when the steam was raised to a working pressure, there was 20 to 30 per cent.


Original surface of water
Present surface of water
fall of 105 ft. now buried up.
Present channel of River 1892
Ridge of granite
Original surface of water
Sand
Longitudinal Section showing Water-fall on original Channel of River and present surface of water in present channel.
1000 1 0 1000 2000 3000 Horizontal Scale of Feet
100 1 0 100 200 300 Vertical Scale of Feet.
240 Channel cut by the water
187 Channel cut by the water
Present Channel
Original channel of river now blocked
Original surface of ground
Sand slid on the clay blocked the original river channel and was afterwards washed away by the water.
Original line of clay
Clay cut out by water
Sand removed by water
Present Surface of Ground
Original surface of water in river
Section along line AB on enlarged plan.
400 0 400 800 1200 Horizontal scale of feet.
100 0 100 200 300 Vertical scale of feet

Profiles of Changes Made by the St. Alban Flood.

in favor of the oil. The saving of oil over wood is not a mere matter of cost. A 6,000 gallon tank is one carload, but the equivalent in wood would be 71 carloads. The same system may also be used in taking off and putting on tires, welding or straightening bent or broken frames, heating sagged crown sheets, etc. There was very little discussion on the report and the Committee was continued for another year.

The report of the Committee on Exhaust Nozzles and Steam Passages was read by the Chairman, Mr. Quayle. This report being a long and important one and having been discussed at considerable length, will be held for more extended treatment than we can give it in this issue.

SANDING DEVICES.

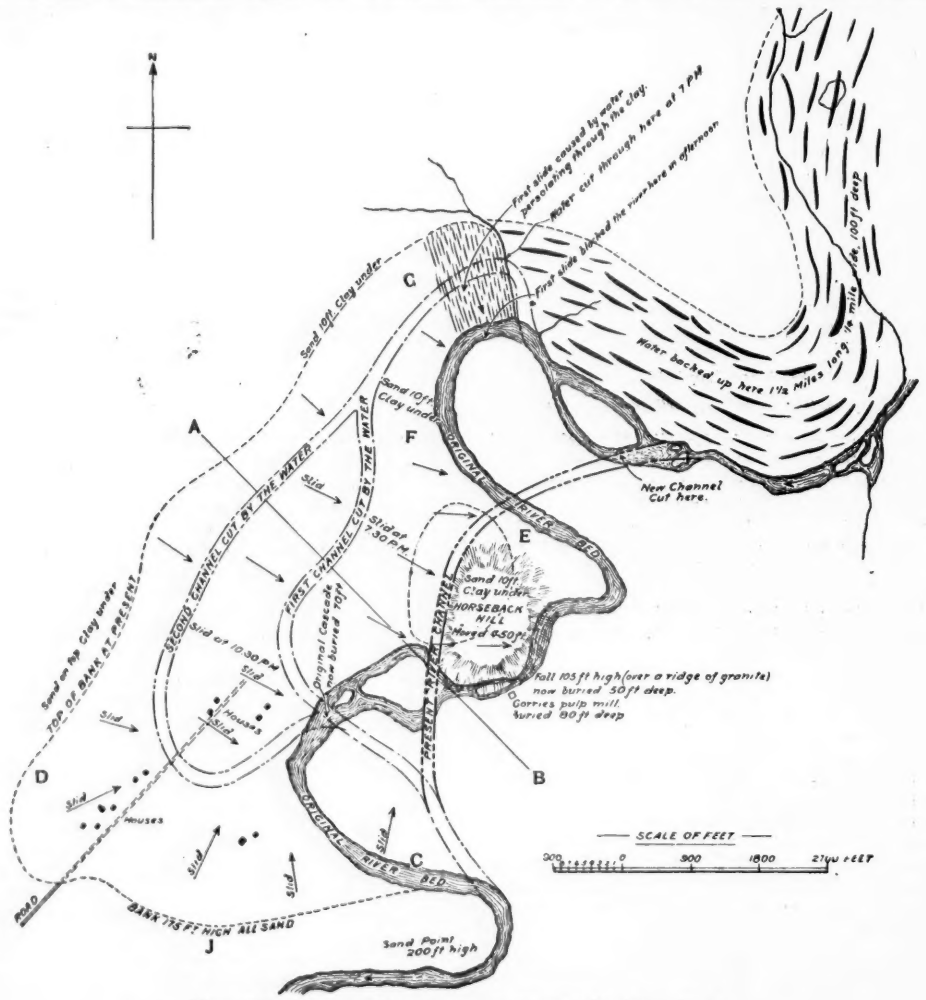
The report was presented by Mr. O. Stewart, Chairman of the Committee, who summed up briefly the history of the application of sanding devices to locomotives. The replies to the circular of the Committee show a wide difference in the saving of sand from the use of air-sanders and the Committee is very doubtful as to the accuracy of the reported saving of from 300 to 600 per cent., which would seem to be a mathematical impossibility. The report contains suggestions that will be of a certain value in further studies of this subject. There was no discussion.

At this point Mr. Lauder brought up the matter of the negotiations with the American Railway Association in regard to getting funds to pay the expenses of tests at Purdue University, and moved the appointment of a committee consisting of Reuben Wells, Willard A. Smith and Professor Goss to take the matter up and advise as to what legislation is necessary to carry out the object. The motion was carried.

The report of the Committee on

SPECIAL SHOP TOOLS

was read by Mr. Gentry, Chairman. Much attention has been paid to portable, universal drilling and boring machines which are indispensable in the larger shops and in any shop handling a few modern engines a month they can be made profitable, and there are on the market several excellent portable drilling devices. The Committee finds compressed air in use by many members for operating


N
First slide caused by water percolating through the clay.
Water cut through here at 7 P.M.
First slide blocked the river here in afternoon.
Water backed up here 1½ Miles long, ½ mile wide, 100 ft deep
Sand 10ft. Clay under
Sand 10ft Clay under
ORIGINAL RIVER BED
New Channel Cut here.
Sand on top clay under TOP OF BANK AT FREEST
SECOND CHANNEL CUT BY THE WATER
FIRST CHANNEL CUT BY THE WATER
Slid at 7.30 P.M.
Slid at 10.30 P.M.
Original Cascade now buried 10ft
Sand 10ft Clay under
HORSEBACK HILL Height 450ft
fall 105 ft high (over a ridge of granite) now buried 50 ft deep.
Gorries pulp mill buried 80 ft deep
Houses
Slid
A
B
C
D
E
F
J
SCALE OF FEET
900 0 900 1800 2700 FEET
ROAD
BANK 75 FT HIGH ALL SAND
Sand Point 200 ft high

Plan of the Various Channels cut during the St. Alban Flood.

hoists about tools. Little progress seems to have been made in utilizing electricity in locomotive repair shops and the Committee is of the opinion that for various reasons not much will be done in this direction for some time to come. Among special tools the best designs of patented small lathe tools are mentioned as being of particular value, and still little understood. The market contains a number of such tools that are almost worthless, but there are good ones to be had and in special places they are much cheaper than cutting up high-priced tool steel. Another class of tools that can be got up in any shop, but that is still not in general use are holding bars or stocks. By the use of these the best quality of tool steel can be used at a small cost and the tools worn down to the lowest limit. The matter of convenient and accurate lathe mandrils has not received the attention that it should have. As a number of members have called attention to an expanding lathe mandril and recommended it highly, the Committee has decided to recommend especially the "Nicholson" expanding lathe mandril as the best of which they have knowledge. The Committee then appends a useful list of special shop tools giving the names of tools, service to be met and names and addresses of the members who can furnish information with regard to them. This is an unpretending and really useful report. It was received as read, and discussed at some length.

Mr. Tongue has two portable shop drilling machines which reduce shop expenses very considerably. These machines are driven by an air motor, and he has compressed air through the shop, roundhouse and car shop.

Mr. McConnell has a great many tools driven by compressed air and makes many cheap and reliable tools from gas pipe. He has small tools for grinding driven by compressed air which run 6 in. emery wheels up to 4,500 revolutions. He also uses compressed air engines for boring cylinders and drilling around frames. These are often used at night when steam is off. The use of compressed air is extended to a great variety of tools in his shops, and he believes that the coming motive power in machine shops is to be compressed air. He has three air compressors and two miles of pipe in the yard, car shop, machine shop, boiler shop and foundry.

Mr. Waitt described somewhat the use of compressed air in the Lake Shore shops. Some of the convenient applications of this power on the Lake Shore have been shown in our summary of the Master Car Builders' report.

Mr. McIntosh mentioned three applications of air which have not been referred to, namely, in the drop pit for taking wheels from locomotives, in lifting rails from cars and in a wheel press, for handling wheels.

Mr. Joughins was much interested in this discussion, for he thinks that steam and shafting as a means of distributing power through shops must pass away. He spoke of the applications of electricity and compressed air, and then suggested that a gas engine is another possible motor for such purposes. It is the cheapest mode of generating power that it is possible to obtain. It can be run with illuminating gas if required.

Mr. George Gibbs said that within the last two or three years the use of compressed air has increased enormously, but there is some danger of its being too extensively used. It has many advantages but is very expensive in cost of power when largely used. In pumping up the pressure the steam is not used expansively; in conducting the air through the piping, the loss by friction is heavy; there is trouble from freezing unless the pipes are carefully protected; the efficiency delivered is probably not over 20 per cent. On the other hand, electricity has a wider field of application, and delivers say 70 per cent. of the efficiency. Electric lighting plants are now common and with small additional expense for attendance, these plants can be run through the day as well as through the night, and supply current for special tools such as transfer tables, hoisting machines, staybolt cutters, etc. So far the greatest drawback to the use of the electric motor has been the complication and delicacy of the mechanism of the motor itself. Until lately the depreciation has been very heavy, but this condition is fast being overcome.

Mr. Blackall spoke of the hydraulic apparatus in use in his shops. Some of this has already been illustrated in the *Railroad Gazette* both in the report of the Master Car-Builders' proceedings and in an earlier issue.

There was some further mention of uses of compressed air which added to the value of the suggestions made by the reports and discussions this year at the two conventions.

The report on

CONDUCTING LOCOMOTIVE TESTS

was then presented by Mr. Dean of the Committee. The object of the report is to standardize methods of testing so that the results obtained may be brought to the same basis of comparison. The shop test can be made with the care and accuracy pertaining to tests of stationary plant, and wherever it is possible the uniform conditions which this method of trial and this alone affords should be applied, but for certain investigations the road test must be used. For road tests the great point of which is to get the efficiency of a locomotive in its normal work, a through train should be taken, running over a route at least 100 miles long, and it should be a special train, not hampered by an absolute time-table. For road tests a dynamometer car should be used giving the pull on the drawbar behind the tender which gives the useful work done and gives a continuous and uninterrupted record throughout the test.

It is recommended in general that the test, whether it be in the shop or on the road, be complete, and that it give all information relating to the performance both of the boiler and the cylinders, that is, the data usually embraced, weight of coal burned, its chemical analysis, its heat of combustion, weight of ashes and cinders, weight of water evaporated and lost by overflow and otherwise, moisture in the steam, temperature of escaping gases and analysis of the gases, force of draught, steam pressure in boiler and steam chest, revolutions of drivers, indicated

horse power, tightness of valves and pistons and pull on drawbar.

For measurement of feed water, a water meter should be used. The apparent weight of water fed should be corrected for differences in the quantity of water at the beginning and end of the period considered, but in measuring the quantity of water in the boiler and in the tank the inclination should be taken into account. The development of the wire-drawing calorimeter has made the determination of moisture in the steam comparatively simple; therefore no reason now exists for omitting this test.

As a standard basis for comparing the efficiency of locomotives, the Committee recommends the number of pounds of standard coal burned per dynamometer horse-power per hour, and the term standard coal means a coal in which the total heat of combustion is 12,500 British thermal units per pound, which represents the total heat of the average grades of coal used in the United States. The consumption of this standard coal is referred to the dynamometer horse-power, first because this is a correct average record of the power developed, and second, it is the useful work done by the engine. The Committee concludes its report with a detailed standard method of conducting efficiency tests both on the road and in the shop.

Mr. Barnes said this is an admirable report, but it is hard to be asked to discuss it without having had a chance to read it, it having been distributed too late for that. He objects, however, to the basis of comparison, namely, the consumption of standard coal per dynamometer horse-power, per hour. If an engine can take but 12 cars and itself up a heavy grade, and can take 30 cars and itself on a level, the percentage of the total power which is absorbed by moving the engine, is very different in the two cases; therefore the pull on the drawbar is not a correct comparative measure of the efficiency of the engine. It is only applicable where the engines are compared in the same service and on the same road. In stationary engines the term efficiency means the amount of power that can be turned into mechanical power per pound of coal, in which there is a variation of say from 3 to 11 per cent. The term when used for locomotive tests should have something like the same meaning.

Nothing is said about the internal friction of the engine which will vary as much as 10 per cent., according to the oiling. The difference in efficiency between two engines may be actually less than the apparent difference due to the difference in oiling. The friction of the load on driving axle will range from one half of one per cent. to 10 per cent. Using the dynamometer basis the uncertainty of the internal friction vitiates the comparison. If you take the indicated horse-power, the internal friction does not appear in the comparison.

Mr. Henderson sees no reference to the thermal unit test which is really our best guide in determining the efficiency. If you compare a compound locomotive with 200 lbs. pressure, and a simple engine with 180, and state the amount of water used you will not get much accurate information. The thermal unit basis is the accurate one.

Professor Goss had not seen the report, but was glad of the opportunity to express his appreciation, and that of the authorities of Purdue University, of the interest which the Association is taking in the work done at the laboratory of that university. In re-establishing the laboratory the authorities have kept in mind the wants of the Association.

Mr. Joughins thinks the Committee is wrong in testing the engine and boiler together as one machine. The boiler and engine are entirely distinct features and their efficiency should be compared separately.

Mr. Dean thought that the wording of the report might be unfortunate in this respect, but the report provides amply for testing the boiler itself.

The report of the Committee on

TIRE TREATMENT

A. E. Mitchell, Chairman, was then read and received.

The Committee was instructed to inquire into the amount of shrinkage to be allowed for large driving wheels, the necessity for retaining rings or clips; the limit of thickness to which tires should be worn, and the greatest permissible depth of groove on tire tread before turning.

In the matter of shrinkage per foot of diameter for wheel centers above 56 inches, the Committee finds the majority of members are using either the Master Mechanics' standard of $\frac{1}{80}$ or $\frac{1}{100}$ in. per foot, and would recommend that these allowances be followed on the larger centers, and future experience will demonstrate the proper shrinkage to use.

The shrinkage used before the use of the driver brake, was about $\frac{1}{80}$ in. per foot. It is asked if an increased shrinkage is necessary because of the driver brakes. It is the opinion of the Committee that no such increase is necessary.

For tires of large diameters, say 56 in. and above, are retaining rings necessary? The Committee considers that retaining rings are necessary on all wheel centers above 62 in. but that the ring is used only to prevent accidents from loose or broken tires, and it is not desirable to recommend that tires may be run thinner with a retaining ring than without one, and furthermore the Committee recommends the same shrinkage with or without retaining rings. The Mansell retaining ring was the only one reported by the members replying to the circular of the Committee as being in use, and the Committee decided therefore to give cuts showing the application of this ring and the location of all bolts and rivets.

In considering the minimum thickness of tires safe to run, the Committee, after careful examination, recommends the passenger limit to be placed at 1½ in. for the last turning; in freight and switching service the limit to be 1¼ in.; the weight on drivers not to be considered, and no distinction to be made when driver brakes are or are not used, or when retaining rings are used.

As to depth of wear on tread, it is believed that this should not exceed ¼ of an inch before turning for road engines, or ⅜ of an inch for switch engines; but it is not thought that an arbitrary rule could be carried out at all times owing to the demands for motive power, although it would be equally advantageous for engine and track if this could be carried out. The Committee recommends the greatest depth of flange permissible as 1½ in. for road engines, and 1⅝ for switch engines, and it submits several gages for the measurement of depth of tread and depth of flange.

The discussion of

COMPOUND ENGINES

was resumed.

Mr. Manchester examined two years ago the records of compound engine 827 on the Chicago, Milwaukee & St. Paul. This engine shows about 11 per cent. fuel economy over nine others of the same make (simple), bought at the same time, and in repairs its cost was somewhat below the average of the other nine. This engine takes its regular turn in all classes of freight service, and is as often run by an extra crew as any of the others. It has given just as good service, made as good time, and is thought as well of among the men as the simple engine.

Mr. George Gibbs said that last year's Committee based its conclusions on the performance sheet of that engine; it had been in use two years, and had been through the shop for general repairs as had five others of the same type (but simple engines) bought at the same time. The conclusion was that the average economy of this compound was 13 per cent., but for the last four months it has been about 11, as mentioned by Mr. Manchester. The valves are beginning to need overhauling.

The "Columbia," World's Fair engine, well known through descriptions in the press, was the first heavy passenger engine to give satisfaction from the start on the St. Paul; it steamed well, was economical, and operated without a hitch. It was rather heavy for the track, and for that reason, more than any other, it was not kept. It was satisfactory while used. It was apparently adapted for passenger service, but Mr. Gibbs does not believe in compounds for that service as a rule. The fuel economy on his roads is to be obtained in the freight service. The conclusions of the Committee of last year were borne out by the experience of this, and a properly designed compound engine will be possibly as light in repairs as a simple, and it is, he thinks, the coming type for freight service.

Mr. Miller had found his experience with the compound satisfactory in fuel saving and about average as to cost of ordinary repairs, but the number of breakages had been against it and it had been laid up a good part of the time. In reply to a question he said the breakages had arisen probably in considerable part from the fact that the piston rod is not long enough to allow proper vibration; and moreover it was steel, which perhaps accounts for some of the breaking.

Mr. Forsyth had had experience with but few compound engines, but this had extended over a long time. His conclusions are that the compound should not cost more in repairs than the simple, and that the saving in coal economy would be clear. His principal trouble had been with the piston breaking in the cylinder, which trouble he thinks has been common in large cylinders; but there was some objection to the engine in the difficulty of handling, which is the fault of the starting gear. He is much pleased with the Richmond on steep grades, which can be worked simple without objection to the Lindner gear.

Mr. Joughins wished to add his testimony in favor of the compound for freight service. He has had two in use for twenty months, and finds that the compound system is the only device which, allied to a locomotive, saves coal every week in the year.

Mr. Brown had worked a Baldwin compound in comparison with a simple of the same capacity in the same service, and the simple engine showed better results. When the steam is shut off on a long hill, the engine does not run smoothly, the journals are worn eccentric, the tires were worn more than on other engines. He has a Cooke compound which is a good engine except that she does not steam as well as the others. On coal test the Baldwin compound used 71 lbs., the Cooke 65, and the simple 52 per mile.

Mr. Gibbs said that with the exception of Mr. Brown the unanimous experience seems to be that compounds are economical and valuable. This experience, however, appears to be confined to the meetings; outside of the Convention the members seem to be unanimous against the compound.

Mr. Garstang spoke again of the compound engine in use on the "Big Four." Since speaking the first day he had telegraphed for data. The comparison with a simple engine coming out of the shop at the same time, run in the same service, gives: Miles to the ton of coal for five months ending April 30, compound engine 23.35, simple 16.94. Coal burned per loaded freight car, compound 3.92, simple 7.42.

Mr. Morris confirmed the experience of the other gentlemen as to the fuel economy, having run compound and simple locomotives in the same service with the same boiler pressure, and indeed identical except in the compound feature. He wishes to go on record as saying that the saving of fuel is 16 per cent. without any extra outlay for repairs.

Mr. Soule has 46 compounds on the Norfolk & Western, 15 in passenger service, 31 consolidation freight engines. The passenger engines have very large wheels. During the last year the passenger business has not justified this equipment, and he thinks that they will cut down the wheels and put the engines into freight service. He bases his faith in the compound on experience in freight service. He has had trouble from the churning action of the piston, which was damaging the cylinder, arising from the fact that there is a knuckling load on the high and low pressure cylinders. He has carried the low pressure rod through the front end of the cylinder, and after a good many months' service thinks that is a solution of the trouble.

The report of the Committee on

COST OF MAINTAINING LOCOMOTIVES,

was read by Mr. W. H. Marshall, of the Committee. The report was one of the most valuable presented, but was little discussed. Mr. McIntosh said that it brings out plainly the fact that locomotives built by manufacturers cost more than those built by the company for maintenance the first two years of the service.

Mr. Miller brought out the same point, and the discussion was then, on motion, closed.

Mr. Marshall moved a reconsideration of the vote to adopt the report of the Committee on Locomotive Tests as standard. He thought it should be tried a year. The motion was lost.

SUBJECTS.

Mr. Gibbs presented the following list of subjects for the coming year:

1. Stacks, Smoke-boxes and Exhaust Nozzles.
2. Locomotive Fire Kindlers.
3. Shop Tests of Locomotives.
4. A Decimal System of Gages for thickness of sheet metal, tubes and wire—the Committee to confer with manufacturers and others, and to submit a practicable system for adoption by the association.
5. The Utilization of Railway Scrap Material, and best method of handling the same.
6. Causes of Bulging in Firebox Sheets.
7. Best Materials for Boiler Tubes and specifications for the same.
8. Piston and Piston Rod Fastening, with special reference to pistons of large diameter and light weight.
9. To Submit a Set of Proportions for Rivetted Joints representing approved practice.
10. Wear of Driving Wheel Tires as affected by weight upon the same.
11. Pneumatic and Electric Transmission of Power in Railway Shops.

OFFICERS.

The following officers were elected: President, Wm. Garstang; First Vice-President, R. C. Blackall; Second Vice-President, R. H. Soule; Secretary, Angus Sinclair; Treasurer, O. Stewart.

After the usual complimentary resolutions the Convention adjourned.

The Leslie Locomotive Fire Kindler.

This device is now used on several important railroads, and it has attracted attention on accout of its efficiency, cheapness and convenience. It is essentially a system of pipes arranged in a roundhouse for spraying oil into a firebox, under air pressure. There is a large tank for storing a supply of oil at roundhouses, a small auxiliary tank, which is fed from the storage tank, and suitable globe and check valves located between them. The check valves automatically feed the oil to the auxiliary tank. An ordinary air pump supplies air to the storage reservoir at a pressure of 60 or 70 lbs., and can also supply sufficient air for the fire kindler, through a pipe connected with the storage reservoir and entering a locker suitably located in the roundhouse. In this locker, an air pressure regulator reduces the pressure to about 20 lbs., thence the air pipe extends around the engine house over each stall. A smaller air service pipe enters the auxiliary reservoir, and, passing through the locker, extends, in close proximity to the air pressure pipe, round the engine house, and is connected with the pressure pipe by suitable branch pipes, through a combination valve over each stall.

An oil service pipe extends from the auxiliary reservoir, and, passing also through the locker, follows the same course as the two air pipes, a branch pipe being connected to the air pipes, and also to the combination valve above the stalls. The latter are so located as to be conveniently operated from the engine. The whole supply of air and oil to these pipes is controlled by suitable valves placed in the locker before mentioned, in which also are located the gages, all being placed under lock and key. In this way absolute control of the whole system is in the charge of one person, and when the system is opened to service, the control of the supply to each stall is governed by its respective combination or regulating valve.

When a fire is to be kindled, sufficient coal is thrown into the firebox to cover the grate thoroughly, a burner, with two small flexible pipes attached—one each for air and oil—is connected by suitable hose couplings to the combination valve; then, by opening the combination valve, the oil is supplied automatically, and the air and oil are simultaneously admitted to the

burner. A small piece of greasy waste is then lighted and thown into the firebox on top of the coal; the air and oil are then turned on to the burner by their respective valves, and the necessary quantity of oil is fed automatically by the air pressure, thus making it practically impossible to injure the firebox sheets by overheating. When the fire has been kindled, the combination valve is closed and the supply of air and oil is cut off. The oil remaining in the pipe is then automatically returned to the auxiliary tank, after which the burner is disconnected.

The storage and auxiliary tanks are buried in the ground outside of the buildings, and below the frost line. The location of the pipes over the stalls and out of the way, the placing of the control of the system under lock and key, so that it cannot be tampered with, ensure safety. The efficiency of operation of this device is not dependent upon the attendant, as he cannot turn on more than a safe supply of oil.

The following is a synopsis of the letters and reports of those using the device on several railroads:—

Chicago, Rock Island & Pacific.—Report of tests made between kindling fires in the usual way, with ⅛ cord of wood, at a cost of 33 cents, and with the Leslie fire kindler using 1½ gallons of crude oil, at a cost of 1.71 cents a gallon. The coal used in each case was Illinois coal. Both engines were washed out and filled with two gages of water. temperature 65 degrees.

(1) Engine 938—Fire kindled with ⅛ cord of wood and 576 lbs. of coal; raised 10 lbs. of steam in 1h. 50 min., and 60 lbs. of steam in 2 h. 37 min. Engine 936—Fire kindled with 1½ gallons of oil and 576 lbs. of coal; raised 10 lbs. of steam in 1 h. 5 min. and 60 lbs. of steam in 2 h. 2 min.

(2) Both engines washed out and filled with two gages of water, temperature 68 degrees: Engine 936—Fire kindled with 1½ gallons of oil and 454 lbs. of coal; raised 10 lbs. of steam in 48 min., and 50 lbs. of steam in 1 h. 36 min. Engine 937—Fire kindled with ⅛ of a cord of wood and 454 lbs. of coal; raised 10 lbs. of steam in 55 min., and 50 pounds of steam in 1 h. 48 min.

(3) Engines 808 and 822. Both engines washed out and filled with two gages of water, temperature of water 65 degrees: Engine 808—Fire kindled with ⅛ of a cord of wood and 605 lbs. of coal; raised 10 lbs. of steam in 3 h., 46 min., and 35 pounds of steam in 4 h. 26 min. Engine 822—Fire kindled with 1¾ gallons of oil, at a cost of 2.99 cents, and 605 lbs. of coal; raised 10 lbs. of steam in 3 h. 45 min., and 35 pounds of steam in 4 h. 25 min.

(4) A test was made on two standard passenger engines, Nos. 937 and 936. Both engines were washed out and filled with two gages of water and fired up with an equal number of pounds of coal—one with ⅛ of a cord of wood, and the other with 1½ gallons of oil—to ascertain which would generate the most steam. Engine 937 as fired up with ⅛ of a cord of dry hardwood and 454 lbs. of coal, which raised 98 lbs. of steam. Engine 936 was fired up with 454 lbs. of coal and 1½ gallons of crude oil, and raised 123 lbs. of steam.

(5) Standard Passenger Engine 934 was washed out and filled with two gages of water, temperature 60 degrees; fire kindled with 500 lbs. of coal and ⅛ of a cord of dry hardwood. Firebox was hot on the outside in 55 min.; 75 lbs. of steam in 4 h. 5 min.

(6) Standard Passenger Engine 936 was washed out and filled with two gages of water, temperature 60 degrees; fire kindled with 500 lbs. of coal and 1½ gallons of oil. Firebox was hot on the outside in 16 min.; 75 lbs. of steam in 2 h 33 min.

On this road fires have been kindled with oil in 1,125 engines since this system has been in operation. Average time taken to kindle the fires with oil was 5 min. for each engine. No skilled labor is required. The last 684 engines kindled with oil cost 2.39 cents per engine.

The saving on this road with the first car load of oil was as follows: Fitting up Forty-seventh Street Roundhouse (35 stalls) with automatic three-pipe system, $669; cost of one tank-car of oil (6,117 gallons, at 1.71 cents), $104.60; number of engines kindled with oil, 4,078; average per engine, 1½ gallons; cost, 2.565 cents. Five hundred and nine and three-quarters cords of wood would be required to kindle 4,078 fires. At $2.65 a cord (average per engine, ⅛ cord wood; cost, 33⅓ cents), total cost to do the same work with wood, $1,350.85. Saving with first car load of oil with kindler, $1,246.83, over and above the cost of the plant, and not allowing for labor saved

Burlington, Cedar Rapids & Northern.—Average cost of kindling one fire with Leslie device, during month of May, 1894, 3 cents; during first week of June, 1.72 cents; number of fires kindled, 514.

Wisconsin Central.—Time required to raise 40 lbs. of steam in several tests:

Feed Water Temperature. F.	Time with Leslie Device. h. m.	Feed Water Temperature. F.	Time with Wood Fuel h. m.	Cost with Leslie Device. Cents.	Cost with Wood or Waste and Oil. Cents.
94	1—14	112	1—4	2.3	38.5
94	1—35	118	0—52	2.3	19.3
98	1—30	93	1—20	2.3	38.5
98	0—52	102	1—30	2.7	19.3
84	1—08	104	0—55	2.7	19.3
85	1—17	98	0—57	3.2	19.3
102	0—45	102	0—52	2.3	19.3
			Waste and Oil for Fuel.		
98	1—0	114	1—30	2.3	35.5
116	0—57	104	1—36	2.3	11.8
100	1—36	136	2—17	2.7	11.8
96	*1—19	96	*2—49	2.3	13.7
83	*0—39	81	*1—24	2.6	17.6

* 30 lbs. of steam instead of 40.

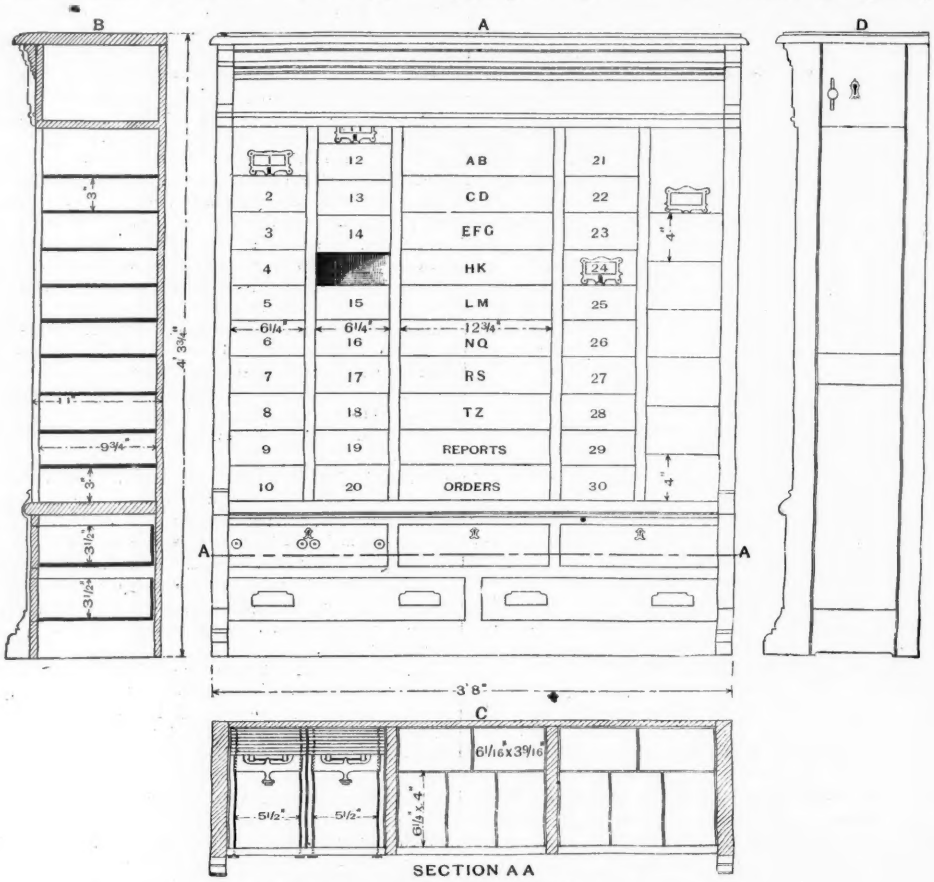
In comparing the oil fire kindler with wood, we must consider the following items: One car tank of 6,000 gallons of crude oil will kindle as many fires as 71 car loads, or 500 cords, of wood; cost of cutting and loading wood on cars; cost of maintaining 71 cars in service for wood and one for oil; cost of illuminating or lubricating oils used to assist wood in cases of emergency, also when wood and coal are so wet they will not readily kindle; cost of wood stolen at the different points along the line; value of space occupied by 500 cords of wood, as against one car load of oil buried in tank underground; the risk of fire consuming 500 cords of wood; the same employees who kindle the fires with wood can kindle them with the Leslie system; time saved in getting up steam; no throwing of wood cinders.

Portable kindlers are made for use in very small roundhouses and in yards. The Leslie fluid distribution apparatus is not confined to kindling locomotive engine fires. It has been used to great advantage for heating dropped crown sheets, for straightening engine frames, taking off or putting on tires and babbitting. It also gives an automatic oil feed for tube welding, or any other kind of furnace where oil is used for fuel.

This device is controlled by Mr. J. S. Leslie, of Paterson, N. J.

A New Cabinet File.

The M. Ohmer's Sons Co. (Dayton, O.) exhibited at the recent conventions a dust-proof cabinet for catalogues, price lists and specifications, the compartments conforming in size to the specifications recommended in the report of the Committee of the Master Car Builders' Association. The accompanying illustration shows quite clearly the design of the cabinet. The front is so constructed that a series of laminated panel shutters, sliding perpendicularly in grooves (see elevation), form a covering for each compartment or pigeon-hole. When access is wanted to any particular compartment, the shutter covering that compartment is raised, and, by a slight pressure on the automatic catch, it will remain open until released by the operator; or, by simply raising



Catalogue and Specification Cabinet.

the lower shutter, the open one automatically releases itself and closes the compartment. The entire tier is movable, and the last compartment is as easily opened as the first. Only one compartment in each tier can be left open at a time, and thus dust is excluded and the liability of misplacement of the contents is reduced. To the face of each shutter is attached the Ohmer latch and label holder, permitting ready change of labels. The latch and label holders are made of bronze or nickel. Within the dust-proof enclosures (see section) are pigeon-holes or pockets, made to sizes corresponding to the specifications of the association.

The horizontal section through A A shows the drawers divided according to the specifications, but the card drawer contains two of Ohmer's patent positive compressor files, indexed alphabetically, to receive and preserve cards in the proper order. Plan D shows the handle to the locking device and key-hole escutcheon.

The locking device is made of steel and malleable iron. It is positive in action, durable and not liable to get out of order. The entire cabinet is locked or unlocked by a hinge movement. It is claimed for this cabinet that it establishes at once in an office a system that could not otherwise be attained, because it is not only a system of indexing complete, but a systematic arrangement for keeping together the catalogues of all manufacturers of any particular class, so that in making references one has before him not only the catalogue of one manufacturer, but of all manufacturers in any particular class. Other claims made for this cabinet are simplicity and strength, capacity and economy of space.

The Car Accountants' Convention.

The nineteenth annual convention of the Car Accountants' Association was held at Old Point Comfort, Va., June 19. President S. H. Church gave the 78 delegates present a hearty welcome. After touching briefly upon the pleasures and advantages of the social intercourse of the members, he announced that the convention would proceed at once to the transaction of business. Reports showed that the affairs of the association were in a very prosperous condition.

Mr. Sleight, of the Vandalia Line, proposed a resolution binding the members of the association to the principle that all cars going in and out of shops should be reported promptly to their owners. Roads detain foreign cars an unreasonable time for renewals and repairs, and the owners trace for their return, only to be met by the statement that they are in the shop. Owners should have this information on the daily junction interchange reports. Discussion developed considerable objection to Mr. Sleight's resolution, on account of the extra labor and expense involved in obtaining and reporting the information, and it was laid upon the table.

The report of the Committee on Per Diem was presented by its Chairman, Mr. James Oborne, of the Canadian Pacific. It was a brief review of the progress made by the committee during the past year, showing that it had contributed not a little toward keeping the question prominently before the railroad world, and before some associations of railroad officers whose sympathy is necessary. Since the last convention, resolutions favoring the adoption of per diem were unanimously adopted by the Eastern Association of Car Service Officers, by the Association of General Freight Agents of Canada, and by the Association of Local Freight Agents of New York, while the American Railway Association is collecting data for the current year, with which it hopes to frame statistics that may enable it to arrive at some satisfactory settlement of this important problem. The committee recommended that a memorial be addressed to the National Association of General Freight Agents and to the Association of American Railway Accounting Officers, soliciting their assistance in securing this reform.

A letter was read from Mr. Sturgis, President of the Association of American Railway Accounting Officers, announcing that his association authorized the appointment of a committee to confer with the Car Accountants' Association concerning the establishment of a "system of accounting for the mileage made by the cars of one road over others," and a committee of five members of the Car Accountants' Association was ordered. The committee will be announced later by the President. Another resolution was also adopted, authorizing the Per Diem Committee to enlist the active co-operation of the National Association of General Freight Agents, by sending them a copy of the committee's report. The discussion upon the report of the Per Diem Committee was not prolonged, because the association, as is well known, is on record as favoring the system strongly. A paper entitled "A Few Facts and Figures Concerning Freight Cars," by W. W. Wheatly (West Shore), was received as a contribution to the current literature upon the car service problem, with special reference to the establishment of the proposed

new system upon a sound and conservative basis. It was ordered printed in the minutes. The report of the Per Diem Committee was accepted and the committee continued for another year.

The committee appointed last year to urge in their respective neighborhoods the adoption of the rules of the American Railway Association to prevent the misuse and diversion of cars, consisted of Messrs. Oborne, Drezmal, Limer, Parke, Wheatly, Currier and McKay. The members of this committee who were present reported that they had been unsuccessful in securing an extended application of the rules, for the reason that many roads considered them ambiguous and likely to cause misunderstanding and confusion. The question was also touched upon whether it was desirable to confine the movements of cars by rule to certain routes. It was becoming an established principle in the handling of cars that economy and efficiency were both promoted by having an ample supply of freight cars, which, without going through a process of selection and switching, may be freely routed in any direction, according to the legitimate demands of traffic. The report of the committee was received as information and the committee discharged.

The Committee on Discussion, of which Mr. C. H. Ewings, of the New York Central, was Chairman, had charge of the investigation during the past year upon the "Hutchins System of Routing Cars," by using wrappers or envelopes, upon which every junction movement was to be entered. After conducting a careful investigation, it was found that 83 per cent. of the roads in the association, owning 91 per cent. of the cars, were opposed to the system.

A paper by Mr. W. E. Beecham, of the Chicago, Milwaukee & St. Paul, upon "The Master Car Builders' Double Stub Defect Card," was read by the author, and received marked attention. The double stub card is used only at Chicago and Kansas City, but Mr. Beecham desires to enlarge its field of usefulness.

Mr. J. R. Cavanaugh (Big Four) read a paper upon "Pooling Cars." He would at the beginning include only box cars in the pool, classifying them according to their dimensions and carrying capacity. At a later date, stock cars, and perhaps others, might be added.

In the discussion on this paper Mr. Beecham doubted the assumption that it would seldom be necessary to move empty cars in any direction if all roads were permitted to use such cars as they had on hand. It always will be necessary to haul empty cars. The movement of traffic can never be evenly dividedin all directions. The present rate of mileage (¾ of a cent) is an embargo upon free interchange. We should bend our energies to securing a reduction of the rate to ½ a cent, so that it will be cheaper to run cars through to destination than to transfer them. Mr. Beecham offered the following resolution, which was carried by a narrow majority, many members declining to vote because they did not know the wishes of their managers: "Resolved, That, while mileage continues to be the basis of car settlement, it is the sense of this association that the rate should be reduced from ¾ cent per mile run to ½ cent on all classes of freight equipment, without reference to ownership." Owing to the fact that the attendance of members at the afternoon session of the convention was small, and that there was only a small affirmative majority in a total of about 35 votes upon this resolution, no special significance can be attached to this action of the association.

The convention was polled upon the question, "Should railroads accept their own cars empty at any junction station, regardless of the original delivery point?" It was shown that in this, as in many other questions, local conditions govern. But the sentiment was strong that coal and other cars engaged in a regular service, and which nearly always obtain their loads at the same points, must always be returned via the original point of interchange. Some roads reported that they were always willing to receive their own box cars and stock cars wherever offered. Other roads would do so occasionally, or when they were short of cars. Summing up the whole matter, it may be said that the discussion plainly indicated that roads would receive their own cars empty at any junction only when it appeared to be for their interest to do so. This is one of the questions which it is difficult to make a general rule to fit.

Mr. E. C. Spalding, General Manager of the Southern Iron Car Line, asked the question, "Why are cars earning less mileage now than ten years ago?" In answering it he submitted many interesting facts and figures. Fast train service, improved distribution, perfect records, and bright minds have been unable to stop the gradual decrease in mileage. Through the influence of the traffic department, cars are used first as soliciting agents waiting for freight, and then, when it is secured, they are delayed at the other end as warehouses. The mechanical department greatly influences car movement. Mr. Spalding might also have added that the transportation department is not entirely responsible for the retention of the mileage system. It is believed that it would have been abolished long ago had the traffic departments given their approval.

Mr. W. H. Rosevear (Grand Trunk) called attention to the "Light and Unremunerative Loading of Freight Cars." This important question is now largely left in the hands of poorly paid agents and freight porters, whose only aim is to get the freight out of their sheds. They load 30 tons or 30 pounds into a car with equal assurance, and without any apprehension of either praise or blame. A foreign car belonging to a New England road passed over the Grand Trunk under bond, containing the precious cargo of one tub of butter, upon which the earnings of his line for a 500-mile haul were 21 cents. Mr. Rosevear believes there has been a veritable epidemic of west-bound light loading of cars belonging to Eastern roads, which have been sent West to earn mileage for their owners, while Western cars were being hauled homeward empty. His company placed a transhipping staff at certain junction points, and in one day the contents of 64 cars were put into 14. In one month, at a single junction point, the loads of 1151 cars were put into 473 cars. These transhipping staffs are still at work. This light loading has not yet ceased, as the returns for a day or two ago show that the contents of 30 cars had been put into 8, and even then the average load per car did not exceed 15,000 pounds.

Valuable papers were read by Messrs. Cavanaugh, Oborne, Maroney, Currier and Anthony.

A spirited discussion was had upon the question of appointing traveling mileage auditors for the purpose of checking up mileage returns, the auditors to be under the control of an Auditing Committee, a fund for the purpose to be maintained by contributions from roads recovering mileage; but it was decided to await the result of the conference with the Association of Accounting Officers.

The constitution was changed so as to provide for two new standing committees of seven members each—one on Car Service and one on Office Methods and Accounting. A special committee was also authorized, to be known as the "Committee on Arbitration." This committee will be composed of all the ex-Presidents of the association remaining in active service. All questions in dispute in which members of the association are interested will be referred to this committee for decision. It is, of course, understood that the committee will decline to act in any case in which all parties to the dispute will not agree to be bound by its decision.

The election of officers resulted as follows: President, W. E. Beecham (C. M. & St. P.); Vice-President, James Oborne (Canadian Pacific); Secretary, George P. Conard (*Equipment Guide*); Treasurer, M. C. Trout (T. & O. C.).

The place chosen for the next annual meeting was San Francisco, Cal., and the time, April, 1895.

Settlement of Demurrage on the "24-Hour Average" Basis.*

At the time car service associations were established, there existed throughout the country a general disposition on the part of the public to make free storehouses of freight cars, and when an agent requested prompt discharge of lading he was considered impertinent. Car famines were of frequent occurrence, and in the worst of these it was not uncommon for large concerns to actually suffer for means of transportation, while they were themselves holding large numbers of cars. . . . While the value of a freight car as a vehicle was about the same at one competing point as another, there were different conditions in different districts, so that different sections of the country demanded different regulations. Forty-eight hours' free time might be agreed upon as right in one district, while others would demand 72 hours, 96 hours, or more. Rules applicable to interior districts could not be agreed upon for seaports. Consequently many exceptions and extensions were made to the simple 48-hour rule recommended by the American Railway Association.

The different rules now in force may be summarized as follows: Freight to and from lake ports is held free in cars indefinitely by all associations. Freight for export is by some associations held free ten days, and for an indefinite period by others. Commodities such as coal, coke, wheat, corn, oats, hay, bran, mill feed, fruits, vegetables and stone, range from 48 to 120 hours. Lines passing through various cities may be members of several car service associations, and no two of them be governed by the same rules. A certain road is a member of eight different car service associations, each of which has a separate code of rules. In fact, uniformity in the application of car service regulations is the exception. There are 42 car service associations in the United States, and there are 42 codes of rules for their guidance.

The tendency to deviate from the 48-hour rule has been observed in the operation of nearly every car service association. The reduction in consignees' detention, even under the varied rules now in effect, has been very satisfactory; but, in order to have permanency and efficiency, the rules should be uniform. They should not be arbitrary, but to a large extent depend upon the cooperation of the public. It seems, therefore, our duty to agree as speedily as possible on a uniform code for the government of all.

Early in the history of our Association, efforts to collect detention charges from large concerns, who handled hundreds of cars monthly, were not rewarded with a very great degree of success. We were met with the argument that credit in time for prompt release of cars ought to be given as against the few cars which were unavoidably held over 48 hours. It was claimed by these concerns, that, as soon as a train of cars were placed, 100 men, or more, if necessary, were transferred from other work to unload them, and the whole train would often be released within an hour. It was pointed out to us, also, that detention charges rarely accrued, except when cars were bunched en route, or delivered out of the order of arrival, and that no charges accrued on empty cars placed for loading. In brief, they claimed that they transacted their business with the railroad companies by wholesale methods, and should not, in justice, be governed by the general rule applicable to consignees handling only a few cars. Our explanation, that after payment of car service charges, our manner of treating claims was by refund voucher, where cars were bunched or placed out of the order of arrival or on account of unavoidable circumstances, was viewed by these institutions as inconsistent with good business methods.

The great problem was how to reach these consignees. Nothing could be more essential to our success—and, in fact, to our existence as an Association—than the cooperation of the large industries. Litigation as a means of settling differences, especially between the railroads and their patrons, was to be deprecated, and only resorted to when all other measures had failed. The oft-repeated declaration that car service associations were not established for the purpose of revenue, but for the prevention of abuses, could not be lost sight of. In fact, we were often reminded of it by these people. The mere publication of car servic rules had caused many of our patrons to build large additions to their warehouses, and they were loading and unloading cars with a view of preventing detention charges.

The Philadelphia Association, early in 1891, put into effect a 24-hour average rule, adjustments being made monthly. After one year's trial, the Association was greatly pleased with it, and the Cleveland Car Service Association adopted it on September 1, 1892. . . . After a practical test of over three years by the Philadelphia Association, almost two years by the Baltimore & Washington Association, several months by the North Eastern Pennsylvania Association, one year by the Central New York Association, and our own experience for nearly two years, we are convinced that the application of the 24-hour average rule is more in harmony with the diverse commercial interests of the country than any other now enforced, and, taken together with the 48-hour rule, is the solution of the car service problem, so far as relates to consignees' detention. Among its advantages are the following: 1. This rule can be uniformly applied to all commodities by all car service associations throughout the country. 2. By this method we gain for the cause of car service associations that all-important feature—co-operation of consignees with the Manager in his efforts to reduce detention. 3. It eliminates all friction between the railroads and the public incident to the enforcement of car service regulations. 4. It secures a written contract to conform to its requirements, besides a guarantee against unnecessary or careless detention. 5. No questions arise on account of bunching, and the railroads are relieved of the extra expense of placing cars in the order of arrival. 6. Consignees and shippers are credited for prompt loading and unloading, and are charged for their neglect to do so. 7. Concerns working under this rule load and unload cars with more system and greater dispatch than under a 48 or 96-hour rule, because it is to their interest to do so; besides, they believe in its fairness, and their co-operation with the Association is freely secured. 8. The application of this rule relieves station agents from appearing before their patrons in the very unpleasant attitude of collectors of car service charges and solicitors of freight, which embarrassing position has caused many good agents to defer the collection of car service charges.

This rule does not discriminate between shippers, as its provisions are offered to all, and if even the smallest shipper working under it can release his cars on an average of 24 hours, we are pleased to refund on a few cars held over time. Small shippers, however, very generally prefer the 48-hour rule. The good business man will often load and unload whole trains of cars in an hour's time, in order to secure credit, but under the 48-hour rule he is not induced to any quicker action than is absolutely necessary to unload within the free time allowed.

Every business concern realizes that in the course of a month storage charges will accrue, in spite of the best efforts to prevent it. The incentive of the 24-hour average rule is to unload whole trains quickly and thus secure credit against such charges.

If this Association could agree upon a code of rules, and submit such code to the Car Service Committee of the American Railway Association, uniform rules could doubtless be speedily established.

[The 24-hour average system, as operated at Cleveland, was described in the *Railroad Gazette* of March 3, 1893. In brief, it provides that if a consignee unloading say 1,000 cars a month, detains them on an average only 24 hours each, he pays nothing, even though individual cars may have been detained beyond the free time limit. The total detention of his cars is computed, 24,000 hours (free time on 1,000 cars) is deducted, and he pays on the balance at $1 for each 24 hours. The essential advantages of the system, as pointed out by Mr. Simmons, are that the consignee agrees to pay his bills cheerfully, whereas, as everyone knows, the ordinary demurrage bill is always paid with reluctance.]

*A paper by Mr. A. M. Simmons, of Cleveland; read at the meeting of the National Association of Car Service Managers at Old Point Comfort, Va., June 19.

National Association of Car Service Managers.*

The fifth annual meeting of the National Association of Car Service Managers was held at Old Point Comfort, on June 18 and 19. There was a large attendance of managers representing Car Service Associations from New England to the Missouri river. The President, Mr. F. E. Morse, of New York, presided. The Executive Committee and Committee on Uniform Method of Accounting and Reporting, made interesting reports, which were discussed by the members very generally. Papers were read on "The 24-Hour Average Plan, as Applied to Large Manufacturing Plants," and "Uniform Rules for Adjustment of Claims for Refund," by A. M. Simmons, of Cleveland; on "Adjustment of Accounts with Auditing Departments," by A. G. Thomason, of Scranton; "How to Obtain Best Results and Most Practical Service from Our Inspectors," by A. L. Gardner, of Baltimore.

Officers for the ensuing year were elected as follows: President, F. E. Morse, New York and New Jersey Association; Vice-President, A. L. Gardner, Baltimore and Washington Association; Secretary and Treasurer, A. G. Thomason, North Eastern Pennsylvania Association.

At the afternoon session on Monday there were present the President, Secretary and other members of the International Association of Car Accountants, and Mr. Joseph Mimmo, Jr. The convention adopted a resolution to the effect "that the changing of the place of meeting of our Association from Louisville to Old Point Comfort, so as to be held simultaneously with that of the International Association of Car Accountants, was a step in the right direction, and that the profit and pleasure of listening to the deliberations of and contact with the members of that body are highly appreciated."

The place selected for the next annual meeting was Cleveland, O.

*Mr. Simmons' paper on the 24-hour average will be found in another column of this issue. Mr. Gardner's and Mr. Thomason's papers were published last week.

RAILROAD GAZETTE

EDITORIAL ANNOUNCEMENT.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

The annual address of Colonel Craighill, Corps of Engineers, U. S. A., President of the American Society of Civil Engineers, calls attention to one fact of immense importance which is little understood by the mass of our people. It is an article of faith that we are so big and so rich that nobody dares attack us, and our immunity from attack for many years is popularly attributed to these qualities. In fact, military and naval experts the world over have known ever since 1812 that we were a very dangerous nation to attack, because of our preparation for defense, and not because of the "great heart" or the long purse of the people. At the beginning of our civil war, we had a system of coast defense that was as good as any in the world, and in some respects better than any other. Our ordnance was of heavy calibre for those days, and our forts revolutionized the practice of harbor defense. Further, from the days when the "sea power" of the Union made itself felt in the war with England in 1812, down to the days, some time after the close of our civil war, when our merchant marine having disappeared, our navy also was allowed to fall far below standard practice—during all that long interval—we were actually one of the most formidable naval powers in the world. This again was not a matter of "great heart" or long purse; it was a matter of scientific, every-day preparation for efficient work. We were known to have swift ships, heavy guns and skillful sailors. The war came and our merchant ships disappeared; but even then we were left with the most formidable navy in the world, for the emergency of the war had developed the iron clad. We were left also with the heaviest naval and sea coast ordnance in the world. These are the plain, every-day reasons why nobody would have dared attack us from 1812 to, say, 1870, or some period in that decade that cannot be definitely fixed. Now, however, we are left with nothing but a great population, a country which still, thank Heaven, has some financial credit, and with an inordinate self-conceit. Whether or not these elements are adequate to the defense of our vast sea coast, the intelligence of the nation must decide. It seems to us as if any third rate power could sack Boston, New York, Washington, New Orleans, San Francisco, and a dozen other cities without the loss of a ship, and with the loss of not more than a score or so of lives.

Sadi Carnot, the President of the French Republic, was murdered last Sunday night at Lyons by an anarchist. Ordinarily, the rulers of the earth come and go without notice in these columns, but M. Carnot was an engineer, descended from a race of engineers, and therefore his death is an event of special interest to many of our readers. He was born Aug. 11, 1837, at Limoges. He was educated at the Polytechnic school, and the school of the Ponts et Chausées, where he graduated at the head of his class. He was an engineer of the Corps, and took a creditable position in his profession. In 1871 he assisted in the organization of the defense of departments about Paris, and in February of that year he was elected to the Chamber of Deputies, in 1879 became Sub-Minister of Public Works, in 1880 Minister of Public Works, and later was Minister of Finance. In 1887 he was elected President of the Republic. Sadi Carnot was the grand nephew of the great Carnot—Nicolas-Léonard-Sadi Carnot—who before he was 24 had written the little book "Réflexions sur la Puissance Motrice du Feu," which made him immortal, and in which he laid the foundation of the science of thermodynamics. Unfortunately for the world and for his own fame the elder Carnot died before he was 36, but not before his genius had perceived and formulated some of those fundamental principles which the physicists of a later generation were to rediscover to their own everlasting glory. In the first quarter of this century he wrote, "It may be laid down as a general proposition that force (la puissance motrice) exists in nature as an invariable quantity, that it is neither produced nor destroyed." The grandfather of the late President was also a man of genius, but it was genius for war, and his doings are a part of the military and political history of France. Sadi Carnot himself does not appear to have inherited the genius of his family, but he did inherit the family probity and patriotism. He was not greatly distinguished intellectually, but he had the higher distinction of character. Carnot's work had not identified him very closely with his profession, as for more than 20 years his energies had been largely absorbed in politics and administration, but a good many American engineers will remember a little incident of 1889 which gives them a personal interest in him. When the "eighty-niners" were received by President Carnot at the Elysée they were, as a matter of course, graciously and hospitably received. One of their number, a past President of the American Society of Civil Engineers, a man who has in him a certain fervor which brought before his imagination all the wonderful past of the Carnot family, was fortunately called on to reply to the President's speech of welcome. This American developed in his reply the idea that the two great republics had chosen to bestow the highest honors within their gift upon engineers. The first President of the United States was an engineer, as was the then President of France. Having made this point he drew from his pocket a map made by Washington himself, and begged President Carnot to accept it. The President was touched, and immensely pleased, and the reception became an international incident.

Southern Freight Rates from Chicago.

The full text of the decision of the Interstate Commerce Commission on the long pending complaint of Chicago and Cincinnati that their freight rates to the Southern States are too high, in proportion to those from New York, has just been issued, and the syllabus appears in our traffic columns. The full opinion fills 27 pages. The gist of it is that although water competiton justifies lower rates from New York to Chattanooga (and beyond) than would otherwise be justifiable, it does not justify the railroads in agreeing to maintain such large differences between the Chicago rates and the New York rates as they have maintained since 1878. This rate agreement (found in the records of the Southern Railway and Steamship Association) is made the basis of the decision; for although it was made long before the enactment of the Interstate Commerce law, the rates (or the relations of rates) established under it are still in effect; so that the railroads are, as it were, convicted on their own testimony. In the agreement of 1878 the roads of the Southern Railway and Steamship Association definitely undertook to make rates from Chicago on manufactured goods high enough so that the price per 100 lbs. should always be 10 cents higher than from eastern cities, and the intention was expressly stated, of protecting the eastern market, and equalizing commercial conditions, two things which the Commission declares to be now unlawful. This view of the law was elaborated in the Eau Claire case decided in June, 1892, and in the James & Mayer Buggy case, decided June 29, 1891.

The reductions now ordered are all from Cincinnati southward, the through rates from Chicago being made up of the (low) rates north of the Ohio added to those south of it. The decision does not go as far as was asked for, but is calculated to enable the petitioners to more successfully compete with Eastern producers in this territory. Following are some comparisons:

Dist.		*1*	*2*	*3*	*4*	*5*	*6*
	Knoxville, Tenn.—from						
560	Chicago, old	116	99	82	64	55	42
560	Chicago, new	93	79	62	44	37	32
735	New York	108	95	83	71	59	48
	Chattanooga, Tenn.—from						
595	Chicago, old	116	99	82	64	55	42
595	Chicago, new	100	88	65	47	39	34
847	New York	114	98	86	73	60	49
	Atlanta, Ga.—from						
733	Chicago, old	147	126	106	85	71	58
733	Chicago, new	126	107	85	62	50	39
876	New York	114	98	86	73	60	49
	Birmingham, Ala.—from						
652	Chicago, old	119	103	83	64	55	42
652	Chicago, new	111	95	72	52	44	34
990	New York	114	98	86	73	60	49

The rates from New York to southern cities by boat to Charleston or Savannah, and thence westward by rail, control the all-rail rates from New York; and in dividing the former, the water distance, about 750 miles, is assumed to be 230 to 250 miles. This reduction of mileage is taken by the Commission as the measure of the reduction below normal railroad rates that should be allowed. The railroads claimed that, as soon as the influence of water competition was admitted, the whole case was put beyond the control of Section 3 of the Interstate Commerce law; but the Commission very properly holds that the degree of liberty to be allowed the railroads depends upon the degree to which they are affected by the water lines.

The trunk lines (New York to Cincinnati) were not made defendants in the cases now decided, and the blame for inequalities is all placed upon the lines south of the Ohio river; but as the Commission decided that the higher rates ought to be reduced, and the lower ones left undisturbed, the question whether these lines were responsible for any of the unjust rates did not come in for attention. Very little freight from New York for the South goes through Cincinnati.

The all rail distances from Cincinnati and Chicago are the following percentages of the "rate making mileages" from New York (The mileages made up by using the constructive water mileage):

From	To Knoxville.	Chattanooga.	Rome.	Atlanta.	Meridian.	Birmingham.	Anniston.	Selma.
	pr.c.	pr.c.	pr.c.	pr.c.	pr.c.	pr.c.	pr.c.	pr.c.
Cincinnati	38	50	69	88	70	68	74	80
Chicago	73	88	112	136	80	92	111	94

Taking this as a basis, the Commission finds that the existing rates from Cincinnati and Chicago are too high, and that they should be reduced to the basis of $1 first-class, Chicago to Chattanooga, and 60 cents from Cincinnati. The reduction is all south of the Ohio, it being found that the average rates per ton per mile are much higher in that territory than in Central territory. Even after the reduction they will, it is claimed, be from 35 to 50 per cent. higher. The rates ordered south of Cincinnati are also higher than the proportions accepted by the roads for the same haul on goods coming from New York. The rates to Chattanooga hitherto in force, with their relation to the rates from New York* appear as follows:

	1st Class.	P. c. of N. Y. rate.	P. c. of distance to dist. from N. Y.
From Chicago	116	102	70
From Cincinnati	76	67	40

The reduction from Cincinnati, therefore, is about 20 per cent. On second class it is less, and on third and fourth it is more, the latter being reduced from 47 cents to 30.

Whether the roads most affected, the Cincinnati, New Orleans & Texas Pacific and the Louisville & Nashville, will obey the order we do not know. There is now a great deal more manufacturing done in the West than when the rates to protect the east were established, and it is quite likely that the reductions may increase the traffic from Illinois, Indiana, Ohio and Michigan to southern points, as Commissioner Clements (who writes the opinion) predicts. Whether these two roads would make more money by stimulating freight from Chicago than by stimulating it from New York is a complicated question which none but themselves can decide, for they have lines running in a dozen different directions. The fact that they have not heretofore voluntarily reduced the rates from Chicago is not conclusive evidence that they do not wish to do so, for such a reduction would precipitate many other disturbances. So far as discrimination *on the same route* is concerned, they could probably well afford to give up what New York traffic they get at the Ohio river, rather than reduce on other freight to the basis charged on that.

But discrimination by one road as between different customers is hardly touched upon in the decision. Indeed, it is quite fair to paraphrase the decision in this way: "You raised rates to keep Chicago shippers from sending their goods south; your motive was contrary to public policy, and so you must put the rates back (or part way back) to where they were." The question whether the rates were not before too low, or are not now low enough, in themselves, is not discussed. The average rate per ton per mile, and the estimated cost per ton per mile are much higher south of the Ohio than north of it, but that is a poor criterion, for the amount of freight per mile of road is less than one half as much. It is also a worthless argument to say that the rates ordered are very much higher per mile than the average receipts of the roads interested; for this average may, and probably does, include an overwhelming proportion of coarse freight, such as coal and pig iron.

The seventh and eighth points of the syllabus cover two side issues which are discussed in the last two

*Other comparisons are shown in the first of the foregoing tables.

pages of the decision. The eighth point doubtless is well taken. It comes under practically the same rules that Judge Cooley applied in the New York & Northern's suit against the New York & New England in May, 1891, and that decision was based upon a very clear and straightforward construction of the law. The seventh point is more doubtful. It is based on the principle that "the law has regard to the substance, rather than the form or name of things, and whatever it prohibits from being done directly cannot legally be effected indirectly." But, as we have recently had occasion to say, the law against pooling can be evaded by methods so subtle that no way has yet been devised to reach and punish them, and this has become so apparent that public sentiment is fast coming to recognize that it is poor policy to prohibit pooling. When a law has lost the support of public sentiment indirect violations of it are of little account.

The Atchison Reorganization.

Of the roads forced into insolvency by the panic of 1893 the Atchison system is the third to put out a reorganization plan. The Erie and the New England are the others. The Atchison plan has been under contemplation a good while and largely embodies the ideas of the foreign security holders. The main points of the plan are as follows:

Either the general mortgage or the second mortgage, as determined by counsel, is to be foreclosed and a new company formed. If the foreclosure is under the general mortgage, past due interest on that mortgage will not be paid, and new bonds similar to the present will be issued, bond for bond. If the foreclosure is under the second mortgage the company will also provide for past due interest and will assume payment of principal and interest on general mortgage bonds.

The new company will issue $102,000,000 capital stock—the same amount as at present.

A new second mortgage of 4 per cent. 50-year gold bonds for $35,000,000 will be issued; $5,000,000 of this amount may be used for floating debt and other purposes, and not more than $3,000,000 of the remainder in any one year thereafter for improvements.

A 50-year income mortgage bond, covering the same property as the second mortgage and bearing 5 per cent. interest, if earned, will be issued to the amount of $115,000,000. This income bond will have voting power with the stock, each $100 par value of bonds or stock will be entitled to vote. Income bonds will be registered for voting purposes. This income bond will be issued as follows: $84,000,000 for the second mortgage "A's," principal and interest at 105; $5,600,000 for the "B's" at 112; $12,240,000 to holders of present stock who pay $12 per share assessment; $13,160,000 for acquiring securities of auxiliary companies as is deemed advisable.

The new stock is to be held in trust until 5 per cent. per annum shall have been paid in cash on the new income bonds, for three consecutive years.

The holders of the "A" and "B" bonds are given the privilege of paying the assessment on the stock not assenting.

The proceeds of the assessment, which will amount to $12,240,000 if all paid, and $5,000,000 of the second mortgage, shall be used as far as necessary to pay the debts of the present company, including interest on general mortgages.

Syndicates may be formed to pay non-assenting bondholders their pro rata proceeds of the sale. Also to furnish money to pay assessments of non-assenting stockholders, should the "A" and "B" bonds not desire to do so.

The Atlantic and Pacific, Colorado Midland and St. Louis & San Francisco may be reorganized according to plans to be submitted later.

Immediately after the reorganization a directory shall be elected by the "A" and "B" bonds (which are to be changed into incomes) and the stock.

It is too early to give other than a general idea of the reception which this plan will have, but it has stirred up considerable opposition, which for the most part comes from the stockholders. They have started to organize an opposition with a view to keeping the road in the hands of a receiver until its earnings improve. They have suffered severely in the reorganization; their stock is not only assessed $12 per share (the only offset being an income bond at par, and worth about 30), but they have practically lost control of the company. Their voting power consists of stock amounting to $102,000,000 plus $12,240,000 incomes secured for the cash assessment, or $114,240,000; off-setting which the incomes of $115,000,000, minus the $12,240,000, or $102,760,000, have voting power. While this leaves the stockholders with a majority vote, it should be considered that the stock is widely scattered and in the past has not been able to keep its property out of receivers' hands, while the bonds are held by comparatively few people, who look sharply after their own interests. The holding of the stock in trust for a certain time does not deprive owners thereof of voting power. The purpose of this measure is not definitely known, but is believed to avoid liability under a Kansas law.

The vesting of income bondholders with voting rights is regarded by many conservative capitalists as a good move. It is a plan which has been followed in a general way in England, and the principle is the same as that put out by Mr. Simon Stern ten years or so ago, in which he advocated that an insolvent road should vest the highest lien bonds on which there was default with control to continue until interest thereon had been paid consecutively for several years, when control should pass to the next highest lien on which there was default, and so on until the total fixed charges were being regularly earned and paid. Then the control should be returned to shareholders.

The chief criticism of the plan now current is regarding the absence of any balance sheet, showing the condition of the company and the disposition of its treasury assets. The Committee states that its own accountant is going over the books and as soon as he makes a report it will publish a balance sheet.

It is reasonably certain that the plan will go through in the form published. The only interests which could prevent foreclosure, viz., the bondholders, are its supporters. The stockholders who suffer have no redress. It is openly admitted that the bondholders dictated the terms of the plan. The plan is very much like that of the New England, and is regarded as a second and emphatic notice to shareholders that they must stand the brunt of the coming reorganizations. This has grown to be a conviction with the holders of stock of other bankrupt roads, notably Northern Pacific and Union Pacific, the reorganizations of which have hardly been talked of, but which nevertheless have scored sharp declines in their stock since the general terms of the Atchison plan became known. This movement following that which took place in the same stocks after the appearance of the New England plan, is conclusive evidence that the assessment features were the cause.

The Prussian State Railroads.

When the yearly budget of the State railroads is submitted to the Prussian House of Delegates, the Minister of Public Works is subjected to all sorts of inquiries and complaints on the part of members who want information, or have fault to find with anything in the railroad administration. At a sitting last April a delegate complained because a charge of 2 marks (48 cents) is made for seats in the new through trains, made up largely in American, limited, drawing-room car style, which are popularly called "harmonica trains," meaning "accordion trains," from the vestibule feature, but which the railroad officials call simply "D trains," meaning through trains. (They spell through with a "D" in Germany.) Minister Thielen said that the department had been urged for years to take this step. "All the newspapers and engineering societies were saying continually, 'Just go to America and see how they carry passengers there, and take lessons from them.' Now we have had the American methods studied on the spot, and have gladly adopted what is suitable for us. The Americans themselves have recognized that the cars in our 'D trains' have many advantages over the American cars. They are much safer and afford much better accommodation than the old style of cars. In their whole arrangement they are luxurious. They ride easier; they do not confine a man to his compartment, but on the long runs, for which alone these trains are designed, they enable him to leave his seat, saunter through the train and visit his fellow-travelers. Moreover—which for most passengers is an important matter—they enable him to satisfy his hunger and thirst. The arrangements for this, and the care with which those who have the contracts for the buffets are selected, satisfy all reasonable requirements. There are some disadvantages, but, on the whole, it is an extraordinary improvement."

Another delegate, doubtless an owner of agricultural lands, complained of the great reductions in suburban rates around the great cities, which, he said, were draining the laborers from the country. This probably did not require any answer, but the land-owner is a power in Prussia, and Minister Thielen was polite to him, not even pointing out that the low fares make it just as easy for the city laborer to go to the farming country as for the farm laborer to go to the city. He did, however, say that the country people went to town because they get better wages there and more amusement, and was able to say that since suburban fares have been reduced Berlin has not grown quite so fast as before, though he was sure the fares had had nothing to do with it.

Another explanation was called out by the change in ticket collection recently made at many stations. Germany has been almost the only country in Europe where you were not required to show your ticket before entering a train, the tickets being collected on the train, as here; but, for lack of a passage through the cars, the collector was compelled to make his way along the narrow foot board on the side of the car, from door to door of the compartments, as is done generally, or often, in other European countries where tickets must be shown before entering the train. The Minister said the change was partly due to the danger to the conductor in collecting tickets in this way, a large and increasing number having been killed or injured while so engaged, and partly to the facilities for fraud which the train collection afforded the train men, several notorious cases of which had been detected during the past year, while doubtless the greater number were not discovered.

In some remarks on live stock transportation, the Minister related the experience of his department in trying to make the carriage more comfortable for the animals. It had always sought information from the parties interested, but in course of time there had been a great change in the opinions of these parties. The railroads had tried a great variety of arrangements to meet the wishes of the farmers and dealers in live stock. Attempts had been made to fodder and water the cattle in the cars, but in general they had proved failures. The apparatus put into the cars for the most part has had to be taken out. With regard to the disinfection of stock cars, to prevent the spread of contagious diseases, the Minister said: "We have long ago come to the conclusion that disinfection in itself is of very little importance, but that thorough cleaning is the main thing. The bit of carbolic acid does not do the business, but the warm water or the hot steam, they do it when they are properly applied and made to reach every crack and cranny. At all the more important live stock stations a veterinary surgeon inspects, and he does it thoroughly. The inspection requires not only the cleansing and disinfection of the cars, but of the platforms and everything used in carrying cattle, and now the Imperial authorities are talking of disinfecting the men who care for the cattle, as well as the cars they ride in." But the Minister was skeptical about the need of lighting the stock cars, which somebody had proposed.

A Deputy remarked that the House had been perfectly flooded with petitions for increase of pay from the railroad employees. Minister Thielen said that this was due to a general dissatisfaction in the community, and not to neglect of the railroad employees by the House or the Administration. He had found that it had been a regular business to draw up petitions for the employees and collect signatures to them. He had had a statement made of what had been done to improve the condition of the men during the past ten years, and it amounts to about $11,000,000 per year, mostly for the men in the lower grades of the service.

The Prussians are eager for a reform in passenger fares, the countries all around them, even Russia, having made great reductions; but the Minister of Public Works, strongly supported by the Minister of Finance, says that the country at this time can't possibly take the risk of a decrease in net earnings, which would probably follow, for a year or so at least, such changes as it is desired to make. The Minister of Public Works, however, said that the present system is doomed, and that, when he can, he hopes to replace it by a simpler system, with no round-trip or excursion or tourist tickets, and his language leads to the belief that he favors a system with rates per mile rapidly decreasing for long distances.

The war of words between the interested parties in England and Colombia over the annullment of the contract with Punchard, McTaggart, Lowther & Co., for the construction of the Antioquia Railroad, seems to abate none of its intensity. There was considerable astonishment in many quarters when the contract price agreed upon was made known, being apparently $50,625 a mile, but actually costing the State of Antioquia $62,775 a mile, owing to the understanding with the contractors that they were to negotiate a department loan for the purpose at 80 per cent. The estimated traffic ready to use the line upon its completion to Medellin was 40,000 tons per annum, calculated to yield a gross revenue of about $1,000,000 a year. The interest on the loan would have been about $450,000, so the contractors argued that the State would be a gainer in revenue, if the working expenses were maintained at 50 per cent. Unfortunately, that *if* is of rather large proportions. It is a curious circumstance, also, that the governor of Antioquia was so determined to close this contract, that, finding the Legislature obdurate, he took the matter into his own hands, executed the document, and succeeded in having it approved by the central government, in spite of the fact that opponents of the measure followed it to Bogotá to oppose its confirmation. This sort of performance may, and may not, be legal in Colombia. The opinions of Colombian lawyers seem to differ on this point, but, at all events, the opponents of this contract have won the day. A new governor being installed, the Legislature at once took up the matter and revoked the action of the former governor by a unanimous vote, which is rather significant. The question of compensation to the contractors is now to be submitted to arbitration. There are, of course, two sides to the story, but the facts are that the English contractors are out of the job, and very angry at Colombia and the Colombians in consequence, and that an opportunity is open for some one else to do the work.

The decision of Judge Ingraham in the Erie bondholders' case Monday has an important bearing upon railroad finance, and upon the present market for railroad securities. He denied the application of John J. Emery for an injunction preventing the registration of the new $70,000,000 mortgage, which is the ground work of the Erie reorganization plan. The plaintiff represented $40,000 of the $38,000,000 second mortgage bonds outstanding. Of this amount, some $31,000,000 bonds have assented to the conversion. The Court held that it had no right to interfere unless it be plainly shown that some legal right of the minority is jeopardized. That is not shown, as the standing of the bonds not assenting is not changed. The

bonds remaining out can take steps at the proper time to enforce the mortgage. Their security will not be lessened if they refuse to assent, as the defendants have done nothing and do not propose to do anything to take from the trustee any right to appropriate any of the securities for the payment of the plaintiff's bonds. The contention of the plaintiff that the trustee of the old mortgage is the trustee of the new mortgage, and consequently will discriminate against the old mortgage, even if sustained, does not violate any legal right of the non-assenting bonds. The holders bought their securities subject to the will of the majority. The decision practically sustains the opinion given in this case by Evarst, Choate & Beaman. The standing of the non-assenting second mortgage bonds is not affected by the reorganization. They remain as a lien on the property, and are entitled to their interest. It strengthens the position of bondholders in other insolvent roads which must pass through the throes of reorganization. This delay in putting into effect the plan has been one of the elements of uncertainty in the very mixed financial situation, and its elimination will materially contribute toward straightening out the tangle.

The threat of the American Railway Union to prevent the movement of all Pullman cars everywhere was ordered carried out on Tuesday at noon, but it does not appear that cars have been actually detached from trains or trains stopped, except in one case, at La Junta, Col. At Chicago some signalmen struck (at Grand Crossing and at the Seventy-first street junction of the Illinois Central) and thereby hindered a number of passenger trains. This would have caused little delay, however, but for the fact that a mob of sympathizers overpowered and drove off the policemen that had been stationed there. Some freight switchmen of the Illinois Central at Chicago struck on the same day, but no intelligent account of their reasons is given. Workmen in Pullman shops at Ludlow, Ky., and St. Louis, Mo., struck on Monday.

One of the elevated railroads in Chicago is trying to attract the people away from the cable roads by providing nice easy seats for the use of its patrons while waiting at stations for trains. It is hinted that a little more speed and a shorter interval between trains would prove better drawing cards than the seats. The cable cars are running with people standing on the outside steps while the elevated cars have vacant seats. It is expected that the few remaining patrons of the elevated will soon be demanding dining cars as the price of their continued patronage. There are even rich old jokes about sleepers.

The British Board of Trade has just prepared statistics of the accidents at highway grade crossings on the railroads of the United Kingdom for the last five years. The total number of persons killed is 369. Of this number, 327 are reported from England and Wales. Only 141 of the fatalities were at public carriage roads, the remainder being at private or "occupation" roads or public foot paths. The return gives references to the laws under which the establishment of these crossings was authorized, from which it appears that out of 361 crossings only 35 were authorized since 1862.

Railroad Building in 1894.

Certainly nobody has been looking for the present year to make much of a record as a year for railroad building, and probably many will be surprised to learn that there has been more than a nominal amount of new road built. Yet the returns of track laid in 1894 up to July 1 show an aggregate of 495 miles. This is the lowest half year's record that has been reported for years. The total is 530 miles below the new mileage built in the first half of 1893, over 705 miles less than in the corresponding period of 1892, and only a third of the track built in the first half of 1891, when 1610 miles were reported. Though the comparisons with the work done in a similar period of the previous years, which were poor years for railroad building, show plainly how great the decline has been actually, yet the record may be regarded as very fair, if, indeed, it is not to be looked at as an unexpectedly good one, considering the conditions in other industrial fields that have existed for a year past. The obvious explanation is to be found in the location of the lines. An examination of the length of the new lines and the parts of the country where they have been built, makes it clear why nearly 500 miles of railroad have been constructed under such unfavorable conditions. No State has built 100 miles of railroad. The highest total is 54 miles in South Carolina, and this is chiefly contributed by one of the branches of the Atlantic Coast Lines, built to continue the policy of that company to shorten its through route to the South. Colorado is next on the list. That State, which felt first of all and most severely the unfortunate results of legislative errors, with characteristic energy and spirit soon started a new development of her gold mines, and has already built nearly 40 miles of railroad in doing so.

There is not another line of those helping to make up the record which has 30 miles to its credit. The South Jersey Road has built 28 miles to reach a terminal on the coast. The Santa Fe, Prescott & Phœnix, in Arizona, has built 23 miles; the Southern Pacific, 20 miles in Louisiana; the Dry Fork, a new line in West Virginia, 20 miles to reach timber. The Chicago, Burlington & Quincy is now laying track on its extension into Montana, to connect with the Northern Pacific and secure a connection to the Pacific Coast. The immense proportion of this new mileage is made up of what, so far as length is concerned, are unimportant lines, but which are of vast importance in developing the industries of the country. The following table accounts for the new track laid, by States:—

Arizona	23	Ohio	43
Arkansas	19	Pennsylvania	30
California	18	South Carolina	54
Colorado	48	Texas	15
Florida	50	Virginia	3
Georgia	8	West Virginia	27
Illinois	4	Wisconsin	24
Louisiana	36	Wyoming	20
Michigan	6		
Minnesota	5	Total United States	495
Missouri	6	Canada	41
New Jersey	35	Mexico	17
New York	2		
North Carolina	19	Grand Total	553

Railroad Matters in Chicago.

Freight Traffic.—The aggregate deliveries of grain at Chicago the past week by eleven Granger lines were only 2,406,000 bushels against 4,160,000 bushels the corresponding time in 1893. The failure of the leading grain carriers to show an increase encourages the impression in some quarters that supplies in the interior have been over-estimated. The movement of miscellaneous freight is also moderate; on live stock there was a good gain despite unsatisfactory prices, indicating that there is still a liberal supply to come to market. A large number of coal mines are resuming work in Illinois and States west of the Mississippi, and the end of another fortnight will probably bring a large increase in coal traffic.

The outward freight traffic, while moderate, compares fairly with a year ago. Last year the financial panic caused a steady decrease in all classes of business in July and August. The situation is now reversed, and fair gains may be expected over last year. The strike of iron miners in northern Wisconsin, if it continues, must work injuriously to the Chicago & Northwestern, and other roads in the iron regions. On the other hand lumber dealers claim that the agricultural States are destitute of lumber, and will become free buyers as soon as the new grain crops begin to move. Interviews with the managers of leading lines discover a more hopeful feeling regarding earnings the closing half of the year. Rates are on the whole better. Said the general manager of one of the largest and most conservatively conducted lines, "Necessity for reform the past twelve months, has led us to study methods in economy, and I am free to say that close observation has enabled us to make sweeping retrenchments where they were previously deemed impossible."

The following shows the deliveries of grain (bushels) received at Chicago by the leading Western railroads for the week ending June 23 and the corresponding time the two preceding years:

	1894.	1893.	1892.
C. & N. West	365,000	463,000	1,252,000
Ill. Cent	336,000	794,000	358,000
C. R. I. & P	389,000	867,000	923,000
C. B. & Q	396,000	902,000	1,456,000
C. & Alton	102,000	128,000	162,000
C. & E. Ill	39,000	64,000	59,000
C. M. & St. P	384,000	513,000	676,000
Wabash	84,000	121,000	125,000
C. & Grt. W	230,000	110,000	381,000
A. T. & S. Fe	69,000	196,000	529,000
L. N. A. & C	12,000	2,000	.....
Total	2,406,000	4,160,000	5,921,000

The deliveries of flour (barrels) at Chicago, by the leading Western railroads for the week ending June 23 and the corresponding time the two preceding years compare as follows:

	1894.	1893.	1892.
C. & N. West	10,518	16,340	15,183
Ill. Cent	1,500	1,800	560
C. R. I. & P	3,500	4,250	5,000
C. B. & Q	9,000	5,529	9,303
C. & Alton	2,400	150	2,350
C. & E. Ill	150	450	.....
C. M. & St. P	11,650	16,050	17,975
Wabash	300	300	3,465
C. & Grt. W	14,961	9,332	14,535
A. T. & St. Fe	.....	4,300	230
L. N. A. & C	.....	.....	....
Total	53,979	58,501	68,601

Passenger Traffic.—The passenger traffic of the Western roads is fairly up to expectations. Referring to the earnings statements now and a year ago, a prominent manager said, "while last year's receipts showed a large excess over those now, the expenses were also much larger. At present the conditions are reversed, the number of trains in service being reduced. As a result the net receipts compared with the gross are decidedly in favor of the present." It must not be inferred, however, that the roads are getting all they should out of the passenger traffic. The Atchison and others are making lower excursion rates to Rocky Mountain points than are necessary.

CHICAGO, June 24, 1894.

There is an international exhibition in Vienna this year chiefly devoted to food and life-saving apparatus, but which has a special department for novelites in transportation. A considerable number of cars and locomotives are shown, and among the novelties is named the American snow plow, the need of which has been felt several times in that vicinity.

A Year's Railroad History in Europe.

This is the title of an article by Mr. W. M. Acworth, the well-known English writer on railroad topics, published in a recent number of the New York *Independent*. We presume that most of our readers are aware that *The Independent* has published its third annual railroad symposium, and have procured copies of the paper; but for the benefit of those who have not time to read the dozen pages taken up by the "symposium," we give below a synopsis, with copious extracts, of Mr. Acworth's article. The other articles are on subjects with which American railroad men are already quite familiar. The authors are J. F. Goddard, E. T. Jeffrey, H. Walter Webb, Dr. William Seward Webb, W. G. Wattson, T. L. Greene, Aldace F. Walker, B. B. Adams; H. T. Newcomb, of the Inter-State Commerce Commission; the Hon. J. W. Johnson, Secretary of the Nebraska State Board of Transportation, and Prof. F. C. Clark, of Leland Stanford Universiy, California. Vice-President Webb gives a chapter in the early history of the New York Central. Mr. Wattson writes about the "masses" in the railroad service, and concludes that, in order to counteract the injury suffered by the railroad interest from adverse legislation, it will be necessary for the railroad men to form political clubs, so as to carry their votes in a body over to the party that will do justice to the railroads. Mr. Walker's paper is the longest in the list. His habits of thought are those of the lawyer, and he summarizes in an interesting way the factors which are gradually compelling the centralization of power in the Federal Government. The original idea of our Constitution was to retain all power, as far as possible, in the individual States, but with the growing importance of the post office, the patent office, the currency, foreign trade, the revenue tariff and inter-State commerce, there has been an inevitable trend away from the principle laid down by the fathers of the Republic. Mr. Walker takes more than half his space to show how the railroads have been the most important of the factors named. The last two writers in the list discuss the railroad question from the local standpoint of their respective States.

Mr. Acworth begins with England, and, of course, regards as the main feature of the year the constant increase of Governmental interference with the management of railroads, both on the commercial and on the police side. The Committee of the House of Commons has recommended that controversies between shippers and railroads which are not settled by the Board of Trade should be taken to the higher and more strictly judicial body, the Railroad Commission, and that the latter body should be armed with full power to reduce rates. Legislation to carry out this recommendation is now pending, and will, in all probability be passed.

Speaking of the law to regulate the working hours of railroad employees, Mr. Acworth says:—

What happens in practice is this: A letter is sent to the Board of Trade asserting that John Jones, signalman, say at Reading, was kept on duty for 86 hours in the week ending April 30. If the Board of Trade writes direct to the Great Western Co. and asks for a report of the hours worked by Jones, it either is, or at least is thought to be, possible that some of Jones' superiors may make things unpleasant for him. Accordingly, the Board of Trade feels bound, in order to conceal Jones' identity, to call for a return of the time of every signalman on the line between London and Oxford, probably some hundreds in number. When the return comes and the one needle required is laboriously extracted from the bottle of hay, it turns out, more probably than not, that the original statement was either simply inaccurate or else referred to conditions so completely exceptional as to justify the over time. Meanwhile, a good deal of official time and labor, both on the part of the railway and the Government Department, has been simply wasted.

A project now before Parliament for a much-needed new suburban railroad has practically been stopped by a demand that workingmen's trains shall be run and carry passengers nine miles for 2 cents. The House of Commons has authorized the construction of a new railroad 40 miles long, in the West Highlands of Scotland, of which three-fourths of the capital is to be furnished (or its interest guaranteed) by the Government, the first departure of the kind in Great Britain.

The salient point of railroad history in France is that in 1893, with 21,000 miles of road, the earnings were only $105,000,000, as compared with $110,000,000 on 15,000 miles in 1881. The sweeping reductions in rates two years ago increased the gross receipts, but not the net. Water competition is fostered by the Government, the expense being borne by general taxation; but, though the Government spends its money this way, it guarantees the dividends on the stock of the railroads, and this cost it $23,000,000 this year. M. Camille Telletan, a well-known railroad authority, says that the indirect burdens upon the tax payer are greater than the direct, so that for next year the railroad deficit will really be about $82,000,000.

In Hungary the zone tariff has proved successful, but our author does not attribute this success wholly to the zone principle by any means. Austria tried it in 1890, and net earnings fell off, so that rates were again increased. Within the past few weeks the Russian Government has introduced an entirely new passenger tariff, resembling the Hungarian zone system in some respects. For distances of a thousand miles the new rates will be only about 45 per cent. of those hitherto in force.

In Germany the railroads have been used by the Government managers, not so much to promote the prosperity of the country, as to produce the largest possible surplus to be handed over as a part of the general reve-

nues of the country. Reductions in rates are promised, but have not been put into effect.

Speaking of Australian railroads, Mr. Acworth says:—

Originally they were managed, like every other department of the Executive Government, by a Minister, in each case member of and responsible to the Parliament of his colony. That, under these circumstances, they were managed, not on commercial, but on political lines, is admitted on all hands. It was found absolutely essential to deliver the railways from the control of the politicians and hand them over to—I borrow the language from the semi-official "Year Book of Australia"—"skilled and capable railway managers, untrammeled by the exigencies that political consideration would often cause to influence the political mind." Victoria led the way, in 1883, by appointing a non-political board of three commissioners, railway experts specially imported for the purpose from England, with very large and almost irresponsible powers, to control its railways; South Australia followed suit in 1887; New South Wales, Queensland and New Zealand, very shortly after. That the new regime was an improvement on the old is not denied. In South Australia and Queensland, the poorest and the least important of the five colonies mentioned, the Commissioners have so far maintained their position without much apparent difficulty. In the larger and richer colonies, however, matters have taken a different course. In New Zealand the Commissioners had the misfortune to offend the at that time almost omnipotent trade unions. On the occasion of a great strike they so far forgot their position as the servants of a democratic community as to venture to carry on the Government railways the wool of a set of capitalists whom the trade unions had decided to boycott. Such conduct was, of course, unpardonable. A bill was introduced in 1892, though not passed, I believe, into an act till the following year, by which the Commissioners' wings were clipped, and a political Minister was once more placed at the head of the ordinary railway management.

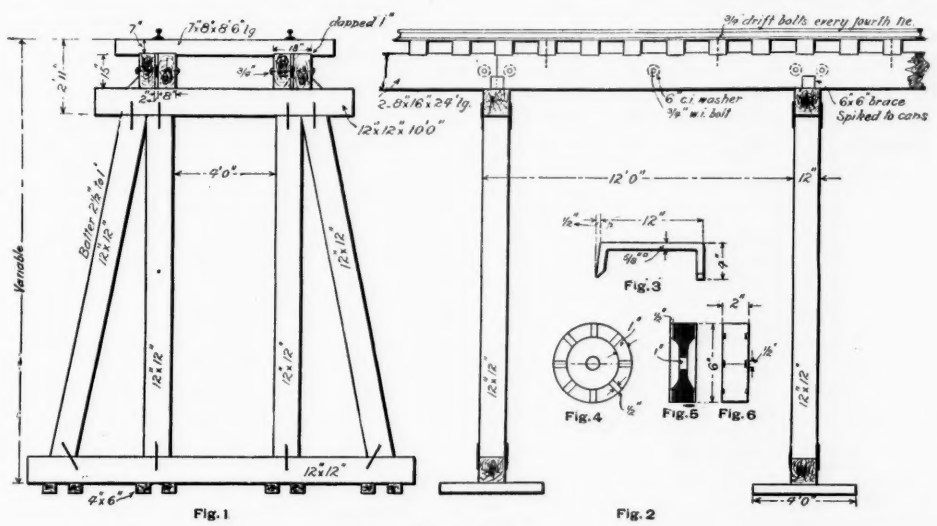
In Victoria the same result has now been reached, though the process has taken longer to work out. It was not until 1892 that the original Chief Commissioner was turned out of office, and a new law, very similar to that of New Zealand, passed. The new men distinguished themselves, acting in obedience to the behests of their political master by perhaps the most sweeping reduction of facilities, coupled with the most sweeping increase of rates and fares, that the railway world has yet known, and, further, according to the testimony of those who should know, by letting down the roads and their equipment to the last possible stage of inefficiency. They, however, apparently were not quite complacent enough, and they have very recently been removed from office at the completion of their appointed term, being replaced in each case by their own subordinates. What the end will be no man can tell..

In New South Wales the Commissioners have so far kept the politicians at bay. How much longer they will be able to do so one cannot say. Signs are not wanting that their position is month by month becoming more untenable.

A Temporary Trestle.

BY ROBERT A. CUMMINGS, ASSOC. M. AM. SOC. C. E.

In railroad work, where the temporary trestle is usually a makeshift, and the material employed is the old lumber taken from permanent trestles, the design is usually left to the judgment of the practical bridge carpenter. There are yet many railroad standards of trestles in use, in which the defects in details seriously affect the general design; and it is only by a comprehensive and practical knowledge of the construction, requirements and maintenance of permanent trestlework, that a satisfactory design can be made for temporary trestle work.



A Temporary Trestle.

In the design of temporary trestlework, the employment of disputed parts of the permanent structure, such as corbels, long ties, etc., should be avoided. Proper provision should be made for the lateral re-alignment of the track, the elimination of surplus refinement in details of ironwork and woodwork, and only the employment of the necessary parts to thoroughly secure the structure for quick erection, are requisites for success.

For temporary trestlework or scaffolding the author has abandoned the use of mortises, tenons and pegs, as requiring too much labor and time in the erection. He has quite successfully employed for some time "dogs" or "dog irons" to fasten the caps and sills to the plumb and batter posts.

Referring to the illustrations, Fig. 1 is a front view of a temporary trestle showing the use of "dog irons." Fig. 2 is a side view of the same. Fig. 3 is a detail of "dog iron." Figs. 4, 5 and 6 are detail views of a cast iron packing block.

The dog irons (Fig. 3) were made of 5/8 in. square wrought iron, with chisel-shaped points at right angles to each other. This was done in order to prevent the splitting of the timber when driven in, by cutting the grain of the caps and sills at right angles to its direction. One leg of the dog iron was flared out 1/2 in. more than a right angle in order that the timbers would be close together when driven in. Two of the dog irons are driven at the same time, one on each side, the simultaneous driving preventing the post from changing its position. The batter posts are slightly dapped into the sills to increase the friction, and are additionally secured by one dog iron on each side. Where it was considered necessary three or four dog irons were used.

The stringers break joints and simply rest on the caps, being held in position by triangular pieces of wood spiked on each side to the cap. This method of construction is of great advantage in the slight re-alignment of track.

The tops of stringers are firmly held in position and well braced laterally by the ties, which latter are dapped an inch on the stringers. On curves every fourth tie is fastened by 3/4 in. drift bolts to the stringers. The rails are then directly spiked to the ties with the ordinary but "deadly" track spike. The ties were the ordinary sawed track ties.

In Figs. 4, 5 and 6 is shown a front elevation, section, and end elevation of the cast iron packing block employed, the radial grooves being provided for drainage of water hat would otherwise remain between the wood and iron or in the hollow centre. These packing blocks are very easily placed in position, are cheap and durable, but above all do not induce rot; on the contrary have a tendency to preserve the wood, through the oxidation of the iron.

While in charge of recent railroad construction, the author employed for overhead and undergrade crossings, etc., a similar temporary trestle, where the size and quality of lumber used corresponded to that employed on the main line permanent trestles. By this means the cost of the temporary work was reduced to the labor of erection. By careful handling during the erection and the taking down of the structure, the lumber was nearly as good as new after nine months' use.

Sleeping Cars on the Continent of Europe.

The lamented Banderali was, in Europe, and especially in France, the propagator of the idea of great trains, comfortably furnished, which the enterprise of Pullman has made common in the United States; but the merit of the initiative belongs to the International Sleeping Car Co. In 1877, when this company was organized, it worked only 9,600 kilometers, and had 58 carriages of all sorts. The following year it worked 400 carriages on 64,000 kilometers. It established the "South express," the "Orient express," the "Club train," and finally, the great international train between Ostend and Vienna, connecting with the Orient express. The International Sleeping Car Co. works to-day to the frontiers of Russia in Europe, from Warsaw to Moscow, from Moscow to Sebastopol, and will some day facilitate the journey of the fastidious traveler from Calais (or Ostend, if he chooses), to Vladivostock.

Meanwhile, the affairs of the company progress, but not with growing profits. In 1882 its dividends were 7½ per cent.; in 1893 they were only 3½. The reasons for the great decline in profits are complicated. The imposition of frontier duties has diminished the amount of the transactions carried on between the nations, and this in turn has diminished the movement of passengers. Again, territorial quarantines which bother everybody, and yet are everywhere without efficacy, have prevented the free movement of people. The port of Lisbon was closed by the sanitary police, and there were no longer travelers for Africa and South America to fill the sleeping and dining car trains. The travel to the East has been diminished by the same cause, and finally, the discontinuance of the "club train," sacrificed to English jealousies [!] was another cause of the diminution of the business of the sleeping car company.

Probably the hotel business, established by the company, has not been altogether profitable, for these hotels have been very lately handed over to another company, in which, however, the sleeping car company has an important ownership.

The Administrative Council of the International Sleeping Car Co. contains representatives of all the nations of Europe. In 1893 the number of car journeys was 76,504, an increase of 3,593 over 1892. The car earnings were 5,437,000 francs against 5,093,000. The profits, after deducting various fixed charges and taxes, were 558,000 francs and suffice for a dividend of 3½ per cent., as has been said above, which was much less than 10 years ago and somewhat less than last year. But we may hope that cholera and protection, those two enemies of intercourse between the nations, will not be eternal. May they kill each other.—*Journal des Transports.*

From all of which the American reader may get a glimpse of the French side of several questions.

TECHNICAL.

Manufacturing and Business.

W. E. Stearns has been appointed purchasing agent of the Berlin Iron Bridge Co., to fill the vacancy caused by the death of William H. Riley.

The Board of Directors of the Westinghouse Air-Brake Co., of Pittsburgh, have declared the regular quarterly dividend of five per cent., payable July 10.

The Detroit Foundry Equipment Co., of Detroit, Mich., has secured the contract to equip the new car wheel foundry to be erected at Lenoir City.

A company called the Williams Palace Car Co., of St. Joseph, Mo., applied for a charter in Missouri last week. The names of those interested in the enterprise are not published.

The A. French Spring Co., of Pittsburgh, Pa., last week filed a petition in the Pittsburgh courts for the dissolution of the firm. It will be succeeded by a corporation to be known as the A. French Spring Co.

The Directors of the Westinghouse Machine Co., of Pittsburgh, have declared the regular quarterly dividend of 1½ per cent. on the preferred and common stock, payable July 2.

The Drexel Railway Supply Co., of Chicago, has leased the buildings of the Treat car wheel plant, at East Chicago, Ind., and will fit them up for the manufacture of steel castings, principally car couplings.

The works of the Heath Rail Joint Co., of Minneapolis, at Chicago Heights, Ill., are expected to be completed by July 15. New machinery is being constructed for the company by Messrs. Williams, White & Co., of Moline, Ill.

The souvenir prepared by the Gold Car Heating Co. for the Saratoga conventions was one of the handsomest distributed there. It was in the form of a crystal paper weight enclosing a small clock, on the face of which was the name of the Gold Car Heating Co.

F. E. Bracy & Co., of Chicago, are having several machines made which will be used in the manufacture of their patent rail spike. The plant for the manufacture of the spike will be located in Chicago. The firm says it has orders now sufficient to keep several machines running for six months.

Among the exhibits at the Master Mechanics' Convention, a list of which we gave in our issue of last week, should have been mentioned that of Ridsdale & Lewis, 390 Cortlandt street, New York, represented by Mr. Thomas A. Lewis, who showed the Duval Metallic Packing, and also represented Mr. Henry R. Worthington and the Pulsometer Steam Pump Co.

The Indiana Steel Casting Co., of Chicago, has been incorporated to manufacture steel castings, car couplers, rolling mill, mining and other machinery. The incorporators are William Chambers, Lafayette M. Chambers and James T. Hall. The factory of the company will be located at Franklin, Ind., where the main building, 60x200 ft., is now being erected.

At a recent meeting of the directors of the Niles Tool Works, of Hamilton, Ohio, Alexander Gordon was elected President, R. C. McKinney, General Manager and Treasurer, and James K. Cullen, Secretary. Mr. Cullen, who has had charge of the Chicago office for a number of years, has removed to Hamilton, Ohio, and has been succeeded by G. F. Mills.

The Cleveland Twist Drill Co., has just shipped three of each size of its grip sockets to the Norfolk Navy Yard. This is the third Navy Yard that has ordered these grip sockets. Many of the large manufacturers have already adopted them, although they have been only lately introduced, and the Twist Drill Company is only about able to keep up with the orders.

The Pittsburgh Testing Laboratory, Limited, has removed its Chicago office from the Rookery building to 1628 Monadnock Block. Mr. T. L. Condron is in charge of the department of bridge and structural material, and Mr. Frank B. Ward, late of Frank Ward & Co., is in charge of the department of rail inspection. The company reports that it has more business on hand at present than it has had at any one time during the last three years. Much of it is the inspection of material for buildings.

The Kings, Queens & Suffolk Company, of Brook, Suffolk County, was incorporated in New York last week to manufacture railroad supplies and rolling stock. The

capital is $600,000 in preferred stock, and $1,000,000 in common stock. The Directors are Frederick W. Dunton, John N. Williamson, and William L. Wood, of Jamaica; George E. Hagerman, of Rocky Point, George B. Finch and William J. Burke, of Brooklyn; Henry C. Rath, of Flushing, Isaac M. Kellogg, of Hollis, William N. Bernton, and D. C. Reusch, of Jersey City, Roman Debes, F. T. Ryan, and Peter D. Sturges of New York City. George B. Finch subscribes for nearly the entire capital stock of the company.

Iron and Steel.

The contract for rebuilding the iron works of the Ellis & Lessig Steel & Iron Co., at Pottstown, Pa., to replace those destroyed by fire on June 10, has been awarded to Cofrode & Saylor. The old mills were wooden structures; the new ones will be iron, and are to be completed by September. The buildings include the nail plate mill, 150 ft. x60 ft., and nail mill, 250x60 ft., with rotary spear house, boiler house, lathe house and merchant mill.

All departments of the Cleveland Rolling Mill Co. plant will resume operations on July 1, giving employment to 4,000 men.

The Edgar Thomson Steel Works of the Carnegie Co., resumed in full on June 26, giving employment to 1,500 men. The plant has been closed several weeks..

New Stations and Shops.

The Missouri, Kansas & Texas has agreed to erect an office building at Parsons, Kan., which, under the Kansas law, will be its general offices, if the people of the city subscribe $25,000 toward the cost of that structure.

Car Lighting.

Another competitor has entered the car lighting field. The Consolidated Car Heating Company has acquired the sole right to introduce in the United States the Pope system of lighting by compressed oil gas, which is now largely used in Great Britain. It is said that there are over 14,000 cars equipped with the Pope system running in passenger service on the English railroads, which is probably quite correct, for the system is certainly very widely used there. The company having the greatest number of carriages with this light is the London & Northwestern, which has nearly 3,700. The Lancashire & Yorkshire has nearly 3,000; the Great Northern over 2,000; then follow nine other companies which are running less than 1,000 carriages each with the Pope light. This system has never been developed in England to anything like the perfection that the Pintsch has reached in the United States, at least so far as car equipment goes; but this is a matter of practice and not of principle. With time, skill and the expenditure of money, the Pope lamps which are now seen in the English railway carriages may be improved to rival the beautiful Pintsch lamps with which we have lately became so familiar here.

The Sykes-O'Donnell Lock and Block.

In our issue of June 22, page 439, we described the Sykes-O'Donnell lock and block apparatus. In that article we said that a model of the apparatus may be seen at the New York office of the National Switch & Signal Company, 32 Liberty street. It appears, however, that the model is on exhibition at the new works of the company at Easton, Pa.

The Manchester Ship Canal.

The report presented to the board of directors of the Manchester Ship Canal on Friday last, June 15, is worthy of being placed on record, since it gives the first traffic return of the undertaking. For the five months from January 1, to the end of May, the tonnage and receipts were as follows:

	£
Merchandise in sea-going vessels, 211,915 tons	28,868
Merchandise in barges, 63,785 tons	919
Ships' dues	395
Passengers, 323,056	3,469
Cattle, 979	50
Total revenue from tolls and dues	33,701

Mr. J. K. Bythell, chairman of the Traffic and Rates Committee of the canal, who presented the report, states that—"As regards working expenses, it may be said, broadly, that the revenue for the five months will more than cover (1) all the expenses connected with the traffic, including wages, salaries, and stores; (2) rates; (3) full proportion of head office expenses during the same period. Maintenance is not included; until the works are more completed, I take it that all outlay on works will be a charge against capital." Among the many reasons adduced to account for the comparatively small use made of the canal so far, Mr. Bythell states:—"The tendency is year by year for the foreign trade transactions, especially in produce, but also in manufactures, to be entered into a long time ahead. A large portion of a crop is often sold, and its destination by sea-going vessels fixed before it is harvested. Last season's American cotton crop had, for instance, practically been dealt with before the canal was opened for traffic, and the next export season will not open until September. It could not be expected, therefore, that people engaged in foreign trade could make immediate use of the canal to any large extent; their engagements precluded it.—*The Economist.*

Moving the Mott Haven Station.

The elevation of the tracks of the New York Central road to permit the construction of a drawbridge 24 ft. above the water of the Harlem River, at Fourth avenue and 135th street, New York City, necessitated the removal of the comparatively new passenger station at Mott Haven (138th street), and this job has recently been done. The *Scientific American* publishes the following notes of the work:

This station was situated on the west of and close to the tracks immediately north of the bridge. Two operations are contemplated. The road is to be changed from a two-track to a four-track way, and the curve between the bridge and the station is to be made an easier one. It therefore became necessary to move the station 50 ft. to the west to give room for the four tracks on the newly determined curve. The station is a brick building 185 ft. long, and averaging 35 ft. in width. The tower rising to one side of the centre to the front, is 19 ft. square and 80 ft. high. The weight of the tower alone is estimated at 500 tons, the rest of the building weighing 1,200 tons. Messrs. B. C. Miller & Son, of Brooklyn, N. Y., the firm that moved the Brighton Beach Hotel in 1888, were in charge of the moving, which was recently executed with great success. The problem was a very difficult one, as the least inequality in support or in moving strain would have cracked the brickwork.

The building was first placed upon Georgia pine blocking, generally of 14x14 in. cross section. The weight to be moved was so great, and the building so liable to damage, that the ordinary system of blocks and falls and windlasses was discarded in favor of jack screws. Fourteen jack screws, each of ¾ in. pitch, 3½ in. diameter, and 12 in. long, were distributed along the front of the building. Each screw had as abutment for its outer end or head, heavy timbers secured to the ground ways by chain. The other or threaded end of the screw entered a hollow beam, such as used by builders, and the end of this beam bore against the transverse sliding ways.

Soap was first applied to the ways by rubbing on the exposed surfaces, while between sliding and ground ways, where one crossed the other, thin slices of soap were introduced. The surfaces were then further lubricated with tallow, and all was ready for the start. The screws were turned until all felt the strain. There were four screws along the tower point. These were gradually turned until the tower moved a perceptible amount—perhaps a sixteenth of an inch. Then the whole series of fourteen screws were turned in unison by stroke of bell. At each stroke one-quarter of a turn was given to each, and the screws being of ¾ in. pitch, this advanced the building $\frac{3}{16}$ in. for each bell stroke. As the screws had a working length of 12 ins., some fifty readjustments were required for the distance. A week of work was required. The building is very irregular in plan, yet, after the transfer, hardly a perceptible crack could be found in brickwork or interior finish.

THE SCRAP HEAP.

Notes.

The track of the Texas & Pacific was greatly damaged by floods in the region of Pecos, Tex., last week.

The Great Northern Railway announced its readiness to resume through business to the Pacific Coast on June 26.

The Baltimore & Ohio ran a special train on June 23 from Baltimore to Chicago, 830 miles, in 19 hours and 46 minutes.

A young man, 20 years old, has been indicted at Poughkeepsie, N. Y., for printing counterfeit tickets over the New York Central.

The Wheeling & Lake Erie has restored the 33⅓ per cent. which was taken off the wages of the employees at the outbreak of the coal strike.

A gang of 150 tramps rode on a freight train the other night from La Crosse, Wis., to Milwaukee, 200 miles, in spite of the objections of the conductor.

The Boston & Albany has discharged its traveling gangs of masons, carpenters and painters, about 100 men in all. It is said that this class of work will hereafter be given out under contract.

The contract for 10,000 yards of fire brick street paving was let last week in Bellaire, Ohio, at 61 cents a square yard, the lowest price on record. This same quality of paving two years ago cost $1.46½ a yard.

Thirteen of the 43 coal miners arrested at Mount Olive, Ill., for contempt of court in holding up a train on the Chicago, Peoria & St. Louis Railroad, which is in the custody of the Court, were identified on Saturday and sentenced to jail for periods ranging from 20 to 90 days.

The extent of the flood on the Northern Pacific is incidentally shown by the statement, published in Tacoma, that 3,500 new telegraph poles had to be sent to Idaho and Montana by the Western Union.

A gang of negro tramps got onto a train of the Lake Shore & Michigan Southern at Westfield, N. Y., last week, and the police had to be called upon to dislodge them. The latest variety of "hold-up" reported is the "seizure" of a freight train by negroes while it was stopping for water at a lonely place in Florida. The negroes held the trainmen at bay while they backed a cart up to one of the cars and secured what bacon and molasses they could find.

The electro-pneumatic inter locking at the large Boston & Maine passenger station was put in operation for the first time on June 18. The employees had not been thoroughly trained in the use of the apparatus and signals, and many trains were delayed one or two hours. The unfavorable conditions were aggravated by the fact that Monday was a holiday in Boston. On Tuesday the difficulties had been reduced, so that the worst detentions were only about half an hour. There are over 500 trains to and from this station daily.

At Round Pond, Ok., where the citizens are much incensed at the Chicago, Rock Island & Pacific Railroad for not running its trains to suit them, the disturbances culminated on June 22 in the destruction of a small bridge by dynamite. The railroad company offered a reward of $500 for the perpetrators of the crime. The railroad company had already brought suit against individuals for damages caused by the wreck when they took up rails and a freight train was run off the track. On the night before the bridge was blown up several shots were fired at a passing passenger train.

Lake News.

A few cargo records of the upper lakes have been broken the past week as follows: Steel steamer Centurion took out from Duluth 3526 tons flour, for Buffalo; steel ship Selwyn Eddy took from Duluth 121,000 bushels wheat, or 3,630 tons, for Buffalo; steel ship Curry took from Ashland 3,819 net tons of iron ore, and brought up from Cleveland 3,500 tons coal. All these cargoes are on the shallow draft of less than 15 feet, now admissable in the upper lakes. The Eddy's cargo of wheat was equivalent to the crop from over 12,000 acres, according to the average of wheat raised last year in the northwest.

The St. Mary's Falls canal has been in the record breaking business the past week, notwithstanding one very important item of traffic, coal, is not yet being carried. Sunday, June 3, the canal passed 78 vessels, registered tonnage 83,924, being 300 tons ahead of any previous day in the canal's history. Monday, June 18, the canal passed 96 vessels, registered tonnage 86,704, freight tonnage 81,464. These vessels were passed on 33 lockages, and the cargoes were chiefly iron ore, flour, lumber and wheat. Only about 10 per cent. of the coal that passed the canal at this time a year ago is now going through, showing an enormous increase in other commodities. Coal will begin to move freely into the upper lake region about next week.

On the Gogebic iron range in Michigan there were out on strike last Saturday about 2,000 men, or more than half the force of the entire range. The Norrie group was idle, usually employing 1,500, the Aurora and Newport 175 each, the Ashland 50, and a few at the ore docks at the town of Ashland. There is apparently no chance of the men winning in their fight. Indeed, it looks as if the mines, which have mined already nearly all the ore they have sold, and have it on stock piles ready to be shipped, will shut down and resume under no conditions, at least for the present. Most of the strikers are Poles and Fins, and men of families. The Mesaba range is pursuing the policy of hiring none but English speaking men, and is finding it a very great source of comfort, now.

Delaying Elevated Railroad Work in Chicago.

The Lake Street Elevated Railroad, of Chicago, has been restrained by injunction from proceeding with the construction of its down-town loop. The bill on which the injunction was granted was filed by the Northwestern Elevated Road, and alleges that the Lake Street Road has exceeded the authority given it by the various ordinances. The charge is also made that the defendant has no legal existence. The defendant company, it is said, has proceeded with its occupancy of the site for its loop without proper condemnation proceedings.

Beats the Punch Photograph Out of Sight.

Hereafter, whenever a patron of the Lynn & Boston street railroad asks for a transfer, the conductor will punch his face. The road has adopted a new transfer check, which is unique. On the front of the check are the profiles of seven persons. Five of these are men, one each with smooth face, a mustache, chin whiskers, side whiskers and full beard. The other two are women, one a young person and the other an older one. When a transfer is asked for the conductor will "size up" the patron and punch the profile that looks like him.—*Boston Traveler.*

Electric Railroads in Europe.

In a paper in the *Schweizerische Bauzeitung*, discussing street railroads with special reference to the new electric road at Zürich, in Switzerland, Mr. P. Schenker points out, among other things, that while in the United States about 60 per cent. of all the street railroads are worked electrically, representing about 7,500 miles of road with about 17,000 cars in use, there are, at the present time, in operation in Europe only about 260 miles of electric street railroad, with an equipment of 720 cars. These are divided up among about fifty different companies. A number of roads, however, are now under construction, and will help somewhat to swell this meagre total.

Landscape Gardening on the Pennsylvania.

R. W. Hutchinson, florist for the Pennsylvania Company at Sewickley, has just returned from a trip over the Ft. Wayne between Pittsburg and Chicago. A beautiful keystone, 15 by 20 ft., has just been completed at Sewickley; also a flag, 10 by 16 ft. on the lawn near the station in plants of different colors. On the company's lawn at Alliance a shield was designed, while at Mansfield the name of the station was laid out in large letters. There were numerous geranium beds planted at Toledo, and on the large lawn at Archer avenue, in Chicago, an immense keystone was made. Mr. Hutchinson will go over the Cleveland & Pittsburg next week. There will be some extensive landscape decorating done at Cleveland. The plants used are all grown in the company's conservatory at Sewickley.—*Pittsburg Post.*

The Petroleum Trade of Batoum.

According to Mr. Consul Stevens, the petroleum industry at the port of Batoum is in a somewhat unsatisfactory condition, owing to the antagonism between the persons of mixed nationality engaged in various branches of the trade and the competition of American mineral oil. At the same time he wrote it was hoped that a union of about 85 per cent. of the naphtha producers would shortly be formed, and that the Government would accord a reduction in the tariff charged for the transport of oils from the Caspian to the Black Sea. Mr. Stevens states that "an important feature which well deserves notice has recently been very successfully introduced by a London firm into the carrying trade of petroleum from Batoum to Eastern ports beyond the Suez Canal, in the shape of tank steamers of a new type, which carry oil in bulk, and which, after thoroughly cleansing their tanks with comparatively speaking quick despatch and little expense, by means of forced ventilation, pressure of steam and chemical treatment, are enabled to load homeward-bound cargoes, such as tea, coffee, rice and other goods particularly liable to deterioration, and deliver them in good order and condition at Mediterranean, Continental and United Kingdom ports."—*The Economist.*

The Canadian Pacific Railroad.

The Canadian Pacific is the greatest of the transcontinental railroads. No other line extends from ocean to ocean. . . . It is not easy for an Englishman to realize what a main line of 2,990 miles means. That is exactly the distance from Montreal to Vancouver, whence the China and Japan and Honolulu and Australasian steamers push their way across the Pacific. Take the longest through journey known to us in the United Kingdom (from London to Inverness) and you will have to pass up and down five times before you cover the distance of this one Canadian main line. . . . All through the winter of 1884-85 9,000 laborers were employed cutting on the section north of Lake Superior, and on one 90-mile section of the road alone as much as two million pounds sterling was expended. . . . But it was on the prairie section, covering the next thousand miles between Winnipeg and the

Rocky Mountains, that the C. P. R. set the world's record in railroad making. There is really very little level country west of Winnipeg; it is all up and down hill, and it took an average of 17,000 cu. yds. of earthwork in each mile to grade the road. . . . With the work thus thoroughly done, what was the record? It was begun in May, 1881, just three months after Parliament set its seal to the charter, and before the end of that year trains were running over 165 miles westward from Winnipeg. In seven or eight months of 1882, 419 miles, more than equal to the distance from London to Edinburgh, were added, and in 1883 another 376 miles, and thus in three seasons the whole 962 miles was covered by one continuous pair of steel rails.

During seven weeks of 1882, or in 42 working days, 134 miles of main track were laid, or an average of 3.19 miles per day, exclusive of sidings. In 1883, even this average was exceeded. In eight weeks, or 48 working days, 166 miles were laid, or an average of 5.46 miles per day, while on one day the record reached the enormous figure of 6.38 miles, requiring 2,120 rails, or 640 tons of rails. . . . But now that the prairie is crossed, what about those three mountain ranges, and those impassable canons through which the Columbia, the Kootenay, the Ille-cille-waet, the Fraser and the Thompson rivers rush down to the Pacific ocean? . . . In the 44 miles between the summit of the Rocky Mountains and the mouth of the Kicking Horse Pass the line makes a sheer descent of 2,757 ft., and this meant crossing the Kicking Horse River nine times, the drilling by hand of 370,000 cu. yds. of rock, and the meeting of many landslips. Then came a gap of 220 miles, in which two mountain ranges, the Selkirks and the Gold range, had to be crossed. . . . It was really a giant's task to find, amid these treacherous glaciers and majestic mountain slopes, a safe pathway for a railway, but the intrepid engineers managed it, and when, on Nov. 5, 1885, the first Montreal train reached a point in the Eagle Pass, near the second crossing of the Columbia River, it found the two construction parties, one working from the east and the other from the west, face to face, with only one rail wanting to make the line complete from sea to sea. And now for the last spike! Was it to be a golden one, as on other American roads? Not at all. It was just as good a spike as any on the road, and no better; and, said the matter-of-fact Mr. Van Horne, "those who want to see it driven will have to pay full fare."—*Percy A. Hurd, in Young England.*

Aluminum.

Like all other metals, except iron and platinum, aluminum combines with mercury, forming an amalgam. The properties of this amalgam are quite remarkable. While aluminum itself is practically not oxidizable, the amalgam is energetically attacked by air and water. Even the slightest combination of mercury with the metal is sufficient to produce this result. The amalgam rapidly decomposes water, liberating the hydrogen and developing a measurable degree of heat, the oxygen combining with the metal and producing hydrated alumina, which at first becomes noticeable in the form of dark spots, but quickly increases in volume and separates in floculent masses. The aluminum, if thoroughly amalgamated, ultimately disappears altogether. One of the points brought out prominently by this phenomenon of amalgamation is that great care must be exercised in preserving instruments made of aluminum from contact with mercury salts and their solutions, and this should be particularly borne in mind in the case of surgical instruments, which, after use, are frequently washed in antiseptic solutions of corrosive sublimate.

Since the beginning of the present year, the Neuhausen Aluminum Co., in Switzerland, has been selling aluminum at five francs a kilogramme, or about 45 cents a pound.

LOCOMOTIVE BUILDING.

The order given to the Brooks Locomotive Works for 60 locomotives for the Central Railroad of Brazil has been previously noted. These engines are to be built for two gages of railroad. Forty of the engines are for a 5 ft. 3 in. gage road, and the other 20 for a 3 ft. 3⅜ in. (1 meter) gage road. Twenty-five of the engines for the broad gage line will be of the suburban type, with 18x24 in. cylinders. They will weigh about 160,000 pounds each, with 122,000 pounds on the driving wheels. Fifteen of the engines will be 12-wheel freight engines, Class F, with 21x26 in. cylinders. These engines are said to be the heaviest ever constructed of this type. Their weight on the drivers is about 146,000 pounds; total weight of engine, 170,000 pounds. The diameter of the boilers is 72 in. Five of the narrow gage engines will have 14x20 in. cylinders. The other 15 will be Class F, 12-wheel freight engines, with 14x20 in. cylinders. All the engines have Krupp tires, copper fire-boxes, and all except the suburban engines have the Belpaire boiler. Some of the engines will burn Pintsch gas in the headlights.

CAR BUILDING.

The Maine Central is reported in the market for 900 cars.

The Lehigh Valley Road has divided its order for 2,000 cars between the Buffalo Car Co., and the Lebanon Manufacturing Co., each company securing 1,000 cars.

The Union Car Works at Depew, N. Y., are rebuilding 50 cars for the Merchants' Despatch Transportation Co., and as soon as this work is finished the works will begin rebuilding 50 cars for the Arms Palace Horse-car Co.

The Harvey Steel Car Works have received an order to repair over 300 refrigerator cars for the Chicago Refrigerator Car Line. The firm has also secured, through Messrs. Thebaud Brothers, of 87 Broad street, New York city, a small order for narrow gage steel flat and box cars, to be shipped to T. de C. Cucuta, Maricaibo, S. A.

Paul Fusz, of St. Louis, the assignee of the Madison Car Co., whose shops are at Madison, Ill., states that the report that the plant would be started up this month is premature, although plans to reopen the shops have been under consideration for a long time. No definite agreement has yet been made providing for the reopening of the works.

BRIDGE BUILDING.

Altoona, Pa.—Viewers have been appointed to locate the site for an iron bridge over Brush Run, on the Brush Mountain Road, near Hollidaysburg.

Ashtabula, O.—The city held an election on June 18 to vote on the proposal to issue $30,000 bonds to assist the county in building a high level bridge across the gulf at Spring street. The proposition was defeated.

Baltimore, Md.—The Canton, Sparrow's Point & North Point Railroad, has applied to the board of public works for permission to build draw-bridges over Colgate and Bear creeks for use of the railroad company. The bridge over Colgate creek is to be a pile bridge and to have a draw 40 feet wide. The bridge over Bear creek is to have a draw 80 feet wide.

Black River, N. Y.—The contract for the new bridge across Black river, at this village, has been awarded to the Oswego Bridge Co.

Braddock, Pa.—The Baltimore & Ohio is building a four-track bridge over Turtle Creek, near the Edgar Thomson mill. The structure will probably be completed by October. Drake & Stratton, of 143 Liberty street, New York, have the contract for the stone work, while the Youngstown Bridge Co. will furnish the iron.

Bradford, Pa.—The City Engineer has submitted plans and estimates for an iron bridge across the Tuna to cost $814.

Cambridge, Md.—Engineer C. H. Latrobe, of Baltimore, recommends that the contract to build a new bridge, with an iron draw, over Cambridge Harbor, be awarded to the Delaware Construction Co., for the substructure, and to the Toledo Bridge Co., for the superstructure, for $4,299. The dimensions of the structure were given in these columns last week.

Cecil County, Md.—The county commissioners of Cecil county have awarded the contract for building seven bridges to the Groton Bridge Co., of New York, for $13,500.

Chesapeake & Ohio.—Work on the new railroad bridge of the Chesapeake & Ohio, over the Big Sandy river between West Virginia and Kentucky has been resumed. The masonry is about completed and the work for the superstructure is arriving.

Gettysburg, Pa.—On June 19 the Commissioners awarded the contract for the erection of a wrought iron bridge across Marsh Creek at Bigham's fording, on the line of Cumberland and Freedom Townships, to Nelson & Buchanan, of Chambersburg, Pa., for $3,149. There were twelve bidders, nine for an iron bridge and three for a wooden one. These were the bids for an iron bridge: Toledo Bridge Co., $4,250; King Bridge Co., of Cleveland, $3,250; Nelson & Buchanan, $3,149; Dean & Westbrook, of New York city, $4,000; Massillon Bridge Co., $3,210; Youngstown Bridge Co., $2,892; Variety Iron Works, of Cleveland, $3,250; Penn Bridge Co., of Beaver Falls, $4,400; Wrought Iron Bridge Co., of Canton, O., $4,190.

Halifax, Pa.—The Northern Central is to erect a new iron bridge across Armstrong Creek, about one mile above Halifax.

Knoxville, Tenn.—Cofrode & Saylor, incorporated, proprietors of the Philadelphia Bridge Works at Pottstown, have secured a contract from the Knoxville, Cumberland Gap & Louisville Railroad Co., for iron bridges to replace the wooden structures on their line. The longest structure is an iron viaduct 800 feet long and 125 feet high, and there is also a three-span deck bridge over the Clinch river and several truss bridges.

Montreal, Que.—A largely-signed petition has been addressed to the City Council, for the purpose of securing aid for constructing a bridge for railroad and general traffic purposes across the River St. Lawrence, from a point in St. Mary's Ward, Montreal, across Isle Ronde to a point on the south side of the river. The estimated cost is $5,000,000. The petitioners agree to connect the southern end of their bridge with the Montreal & Sorel, Central Vermont and Grand Trunk Railroads, and the city end with the Grand Trunk, Canadian Pacific, Atlantic & Lake Superior, and Montreal Pa k & Island Railroads. The petition is signed by the Montreal Bridge Co., Henry Hogan, President; J. R. Thibaudeau, Vice-President; A. F. Gault, Director, and Robert Watson, Secretary and Treasurer.

New York City.—The Board of Engineers recently appointed by President Cleveland to determine upon the length of the span of the projected railroad bridge over the North river between New York and Jersey City, and to pass upon the safety and practicability of the plans to be submitted by the company which is to build the bridge, met in the Army building, Whitehall street, New York, on June 25, for organization. The board consists of Major C. W. Raymond, of the Engineer Corps of the Army, Theodore Cooper, George S. Moreison, of Chicago, G. Bouscaren of Cincinnati, and Prof. W. H. Burr, of Columbia College. The board organized by the election of Major Raymond as President and Theodore Cooper as Secretary.

Norristown, Pa.—J. Denithorne & Son, of Phœnixville, Pa., have been awarded the contract for the iron work of two bridges, at their bid of $1,160 and $1,000 for the Rose Glen and Humphrey's Mill structures respectively.

Nursery, Tex.—The Victoria County Commissioners have awarded the contract to the King Bridge Co., for an iron bridge across the Guadaloupe river near Nursery.

Philadelphia.—An ordinance has been introduced in the Common Council to authorize the construction of bridges on the lines of Sixty-fifth street and Gibson avenue over the Baltimore & Philadelphia Railroad.

The Councils' Survey Committee has reported favorably an ordinance providing for a bridge to carry the Germantown branch of the Pennsylvania Railroad over Jefferson street, in the Twenty-second Ward. The cost of the bridge is to be $20,000 and the railroad company is to bear one-third of the expense.

Pittsburg, Pa.—The House of Representatives has passed the bill authorizing the Pittsburg & Mansfield Railroad to bridge the Monongahela river at the foot of Ferry street, Pittsburg.

Spokane, Wash.—A petition has been filed with the city clerk, asking the council at as early a date as possible to replace the old wooden bridge, built by subscription, with a new steel bridge to be built by the city. The estimated cost is $15,000. Among the signers of this document are A. J. Ross, A. P. Wolverton, D. M. Drumheller, and many others.

Westchester, Pa.—Bids for building the new county bridge over Chester Creek, in East Goshen Township, will soon be invited; also bids for an iron bridge of 60 ft. span over Beaver Creek, East Brandywine, and a 46-ft. clear span bridge over White Clay Creek, New Garden.

Williamsport, Pa.—The County Commissioners last week awarded the contracts for the Muncy, Jersey Shore and Perryville and Fields Bridges. The contract for the Muncy bridge was awarded to the Horseheads Bridge Co., of Horseheads, N. Y., at their bid of $23,950. The contract for the Jersey Shore bridge was awarded to the Owego Bridge Co., at their bid of $14,800, and the contract for the Perryville and Fields bridge was awarded to E. Keeler & Co., of Williamsport, at their bid of $4,185. There were 13 bids received for the Muncy bridge, the bids ranging from $23,950 to $28,000. For the Jersey Shore bridge 12 bids were received, ranging from $14,800 to $17,800, and for the Perryville and Fields bridge 11 bids were received, ranging from $4,185 to $12,220.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Canada Southern, semi-annual, 1¼ per cent., payable Aug. 1.
Chicago & Eastern Illinois, quarterly, 1½ per cent. on the preferred stock, payable July 2.
Chicago, Rock Island & Pacific, $1 per share, payable Aug. 1.
Concord & Montreal, $1.50 per share, payable Aug. 1, 1894.
Dexter & Newport, semi-annual, 3 per cent.
Dexter & Piscataquis, semi-annual, 2½ per cent.
Fitchburg, 1 per cent. on the preferred stock, payable July 6.
Lake Shore & Michigan Southern, semi-annual, 3 per cent., payable Aug. 1.
Maine Central, $1.50 per share.
Michigan Central, 2 per cent., payable Aug. 1.
New York Central & Hudson River, 1½ per cent., payable July 16.
Norwich & Worcester, semi-annual, 4 per cent., payable July 5.
Worcester, Nashua & Rochester, $2 per share, payable July 2

Stockholders' Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Chicago Junction Railways & Union Stock Yards Co., annual, Jersey City, N. J., July 5.
Hancock & Calumet, annual, Hancock, Mich., July 10.
Marquette, Houghton & Ontonagon, annual, Marquette, Mich., July 19.
Mineral Range, annual, Hancock, Mich., July 10.

Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *Western Railway Club* meets in the rooms of the Central Traffic Association, Monadnock Building, Chicago, on the third Tuesday in each month, at 2 p. m.

The *New York Railroad Club* meets at the rooms of the American Society of Mechanical Engineers, 12 West Thirty-first street, New York city, on the third Thursday in each month, at 8 p m.

The *New England Railroad Club* meets at Wesleyan Hall, Bromfield street, Boston, Mass., on the second Wednesday of each month.

The *Central Railway Club* meets at the Hotel Iroquois, Buffalo, N. Y., on the fourth Wednesday of January, March, April, September and October.

The *Southern and Southwestern Railway Club* meets at the Kimball House, Atlanta, Ga., on the third Thursday in January, April, August and November.

The *Northwestern Railroad Club* meets at the Ryan Hotel, St. Paul, on the second Tuesday of each month, at 8 p. m.

The *Northwestern Track and Bridge Association* meets at the St. Paul Union Station on the Friday following the second Wednesday of March, June, September and December, at 2.30 p. m.

The *American Society of Civil Engineers* meets at the House of the Society, 127 East Twenty-third street, New York, on the first and third Wednesdays in each month, at 8 p. m.

The *Western Society of Engineers* meets on the first Wednesday in each month, at 8 p. m. The headquarters of the society are at 51 Lakeside Building, Chicago.

The *Engineers' Club of Philadelphia* meets at the House of the Club, 1122 Girard street, Philadelphia, on the first and third Saturdays of each month, at 8 p. m.

The *Boston Society of Civil Engineers* meets at Wesleyan Hall, 36 Bromfield street, Boston, on the third Wednesday in each month, at 7.30 p. m.

The *Engineers' Club of St. Louis* meets in the Missouri Historical Society Building, corner Sixteenth street and Lucas place, St. Louis, on the first and third Wednesdays in each month.

The *Engineering Association of the South* meets on the second Thursday in each month, at 8 p. m. The Association headquarters are at The Cumberland Publishing House, Nashville, Tenn.

The *Engineers' Society of Western Pennsylvania* meets in the Carnegie Library Building, Allegheny, Pa., on the third Tuesday in each month, at 7.30 p. m.

The *Technical Society of the Pacific Coast* meets at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., on the first Friday in each month, at 8 p. m.

The *Association of Engineers of Virginia* holds informal meetings on the third Wednesday of each month, from September to May, inclusive, at 710 Terry Building, Roanoke, at 8 p. m.

The *Denver Society of Civil Engineers* meets at 36 Jacobson Block, Denver, Col., on the second and fourth Tuesdays of each month except during July, August and December, when they are held on the second Tuesday only.

The *Montana Society of Civil Engineers* meets at Helena, Mont., on the third Saturday in each month, at 7.30 p. m.

The *Engineers' Club of Minneapolis* meets in the Public Library Building, Minneapolis, Minn., on the first Thursday in each month.

The *Canadian Society of Civil Engineers* meets at its rooms, 112 Mansfield street, Montreal, P. Q., every alternate Thursday, at 8 p. m.

The *Civil Engineers' Club of Cleveland* meets in the Case Library Building, Cleveland, O., on the second Tuesday in each month, at 8 p. m. Semi-monthly meetings are held on the fourth Tuesday of each month.

The *Engineers' Club of Cincinnati* meets at the rooms of the Literary Club, No. 24 West Fourth street, Cincinnati, O., on the third Thursday in each month, at 7:30 p. m. Address P. O. Box 333.

The *Engineers' and Architects' Club of Louisville* meets in the Norton Building, Fourth avenue and Jefferson street, on the second Thursday in each month, at 8 p. m.

The *Foundrymen's Association* meets at the Manufacturers' Club, Philadelphia, Pa., on the first Wednesday in each month.

Engineers' Club of Cincinnati.

The last monthly meeting of the Club before the Summer intermission, was held in the rooms of the Literary Club, 24 West Fourth street, on June 21.

Mr. A. A. Stuart, read a paper on "Problems Growing

out of the Construction and Operation of Elevated Railways."

There will be no meetings in July and August.

Railway Accounting Officers.

The sixth annual meeting of the Association of American Railway Accounting Officers was held at Washington, D. C., on May 30 and 31. There was a good attendance. In the absence of President C. P. Leland (whose death is recorded in another column), Mr. Erastus Young presided. The Executive Committee and Standing Freight and Passenger Committees made voluminous reports, which were fully discussed and adopted. Papers were read as follows:

The Settlement of Traffic Balances, J. O. Clifford; The Prepaid Order, W. Randall; That Some Other than the Accounting Department should Handle Claims, W. H. Dudley; That the Accounting Department should handle Claims, J. H. Sturgis.

Officers for the ensuing year were elected as follows:—President, C. I. Sturgis, C. B. & Q.; 1st Vice-President, Erastus Young, Union Pacific; 2nd Vice-President, E. S. Thomas, Baltimore & Ohio South Western, and Secretary & Treasurer, C. G. Phillips, Chicago & North Western, Chicago.

The place fixed upon for the next annual meeting is Detroit.

Western Society of Engineers.

The regular meeting was held at the Grand Pacific Hotel, on June 6, at 8 p. m., President Herr in the chair, and Mr. Charles S. Hill and Arthur H. Lloyd were elected members. A paper on typhoid fever and the epidemic at Ironwood, Mich., a mining town of about 12,000 inhabitants, in 1893, by E. A. Rudiger, was read by the Secretary. The next paper read was on the Halstead street lift bridge by Samuel M. Rowe, and was illustrated by blue prints. It was discussed by Messrs. C. S. Strobel, C. V. Weston, Goldmark, Horton and Evans. These papers will appear in the *Journal of the Association of Engineering Societies*.

About 80 members and guests of the society participated in an excursion to the South Branch of the Chicago river, on June 2. Among the points of interest visited were the foundations for the new Van Buren street bridge, the folding bridge at Canal street, the Halsted street lift bridge and the Bridgeport Pumping Works. Arrangements will be made by the Secretary for Summer excursions on the lake to visit the water works intakes, Calumet Harbor and other places, and another to the Sanitary District Works. The next meeting will be held in the Grand Pacific Hotel on July 11, at 8 p. m., the date of the July meeting falling on a legal holiday.

Engineering Association of the South.

The regular monthly meeting of the Association was held at headquarters, in Nashville, Tenn., on June 14. Mr. W. M. Leftwich, Jr., Assistant City Engineer, of Nashville, was advanced from junior to full membership. The resignation of Prof. Olin H. Landreth, who has accepted the Chair of Civil Engineering, at Union college, Schenectady, N. Y., was presented, and in accepting the same resolution was adopted, reciting that in accepting the resignation of Professor Landreth, the Association appreciated the fact that it loses a member to whom it is indebted for the initial labor which was essential to its creation, and for efficient services as Secretary and member, and wishing him success in his new field.

The paper of the evening entitled, "A Sketch of a Modern Blast Furnace Stack," by Mr. A. Porter Gaines, Superintendent of the Cowan Division, of the Tennessee Coal, Iron & R. R. Co., was read by the Secretary in the absence of the author. The following is a synopsis: "The universal construction of a modern stack is a round sheet iron shell somewhat in the form of a truncated cone, supported at the base, which is the widest part, by columns. This shell is lined with fire brick, having a packing space of 3 to 5 inches between the shell and the brick, which is filled with some light, loamy material. The points of difference are the dimensions of this shell, the height, diameter, distance from hearth or bottom, which shell shall be supported, and interior shape or lines, as given by fire brick lining. The conditions governing the dimensions are chiefly the character of the stock (fuel, ore and flux) and the volume of the blast. Modern practice is toward large outputs, and looking to this end the dimensions are as large as these conditions will admit. The interior shape or lines is more or less in dispute among furnace men. It is largely theory as to the mechanical arrangement and chemical changes that material undergoes in the stack, so necessarily it follows that there would be more or less difference as to the interior arrangement of furnace to obtain the best results. Then also are the conditions so different in different localities that it is questionable if there will ever be any specific lines found that will give universal success. Although there have been wonderful results obtained from the modern blast furnace stack, both in fuel consumption and output, still it is far from having reached its full development.

In the discussion which followed, Mr. A. H. Wood called attention to the fact that the output of the furnace at Cowan had been almost doubled recently by changing the "lines" by closer attention and heavier driving than formerly, and that the output of other furnaces of this company had been largely increased by heavier driving only, without change of lines. Major Lewis suggested that this increase was at the expense of the quality of the iron, but this assertion was denied by others. The discussion was participated in by Major Lewis, Mr. Wood, Dr. Dudley, Mr. Calhoun and Mr. J. S. Walker.

PERSONAL.

—Mr. E. T. McConnell, Engineer of Maintenance of Way of the Peoria & Eastern, at Indianapolis, has resigned.

—Mr. Hugh M. Walters, President of the Kishacoquillas Valley Railroad in Pennsylvania, died in the Park Hotel, St. Louis, Mo., on June 20, where he had been for several weeks.

—Mr. J. M. Turner has resigned the position of Superintendent of the South Carolina & Georgia Railroad, and Mr. W. S. Ward has been appointed General Superintendent of the line.

—Mr. C. E. Bray, Eastern Passenger Agent of the Wisconsin Central at New York, has been appointed General Traffic Agent of the Chicago & Northwestern at San Francisco, to succeed Mr. E. A. Holbrook, resigned.

—Mr. George M. Porter, President of the St. Croix & Penobscot Railroad for many years, and senior member of one of the most prominent lumber manufacturing firms in Eastern Maine, died in St. Stephen, N. B., June 22, aged 90 years.

—Mr. T. W. Kennan, a well-known railroad man and formerly connected with the road, has been appointed by Vice-President Odell, Superintendent of the Central division of the New York & New England road, vice Mr. G. W. Offutt resigned.

—Mr. E. A. Holbrook, General Traffic Agent of the Chicago & Northwestern at San Francisco, has resigned on account of ill health. Mr. Holbrook has held the position since December, 1888, and was formerly General Passenger and Ticket Agent of the Chicago, Rock Island & Pacific

—Mr. John W. Hall, Treasurer of the Richmond & Danville Railroad Company, and recently elected Treasurer of the new Southern Railway Company, died suddenly at his home in Washington, D. C., on June 2. Mr. Hall was widely known throughout the South from his long connection with railroad matters.

—Mr. Virgil Powers, State Railroad Commissioner of Georgia, Public Works Commissioner of the City of Macon, Ga., died on June 2, after several months' illness, at the age of 75 years. He was for many years Superintendent of the Southwestern Railroad and also Commissioner of the Southern Railway & Steamship Association. He was one of the best known railroad men and leading citizens of Georgia.

—The honorary degree of Doctor of Science was conferred on Mr. Elmer L. Corthell, by Brown University, his alma mater, at the Commencement, June 20. This was in recognition of his important works in this country and Mexico during the last quarter of a century, and his literary contributions to engineering science. Mr. Corthell was the guest of the university at the Commencement dinner and by invitation addressed the Alumni.

—Mr. P. St. M. Andrews, who died at Norwich, Conn., last week aged 75 years, was for many years Superintendent of the Norwich & Worcester Railroad, and lately was its managing agent under the lease to the New York & New England road. He was Secretary of the Norwich & New York Transportation Co., and had been in the transportation business for nearly 50 years, being all of that time connected with the Norwich & Worcester road. He became Superintendent of the road in 1857.

—Mr. L. A. Emerson has been appointed Traffic Manager of the South Carolina & Georgia Railroad, with offices at Charleston, S. C., and No. 96 Broadway, New York. Mr. Emerson was for several years General Traffic Manager of the Rome, Watertown & Ogdensburg Road, but resigned in 1892, when Mr. Charles Parsons sold his interest in the property to the New York Central Railroad. He then became Traffic Manager of the Central Vermont Road, and has held that office up to the present.

—Mr. Nicholas Monsarrat, recently Vice-President and General Manager of the Cleveland, Akron & Columbus road, has been appointed Joint Receiver of the Valley Railroad of Ohio, to succeed to the vacancy caused by the death of Mr. J. K. Bole. He is well known in Ohio, where he has resided since 1881, as General Manager of the Cleveland, Akron & Columbus. He first became connected with that road when it was the Cleveland, Mt. Vernon & Dayton, as General Superintendent. On the reorganization of the company as the Cleveland, Akron & Columbus, Mr. Monsarrat became President and General Manager, and held those offices until 1893, when Mr. George W. Saul became President, and Mr. Monsarrat was elected Vice-President.

—Mr. W. H. Baldwin, Jr., who was last week elected Third Vice-President of the new Southern Railway Co., the successor of the Richmond & West Point Terminal Co., will have charge of the operation of the railroad, and will assume his new duties by July 1. He is now General Manager of the Flint & Pere Marquette Railroad, having held that office for the last three years. Mr. Baldwin began his railroad work on the Union Pacific during the administration of Mr. Charles F. Adams. He was Division Freight Agent of that road at Butte, Mont., in 1888, and then became Assistant General Freight Agent at Omaha. He was then Manager of the Leavenworth Division of the railroad until 1890 when he became Assistant Vice-President at Omaha. He went to the Flint Pere Marquette road in 1891.

—Mr. Cyrus P. Leland, Auditor of the Lake Shore & Michigan Southern Railway Co., died at his home in Cleveland, O., on June 20, having left his office only on the 8th of May preceding, yielding to a disease of the kidneys accompanied by an affection of the heart. Born at Irving, Chautauqua County, N. Y., July 31, 1836, Mr. Leland entered the railroad service May 21, 1855, since which time he has been consecutively, May 21, 1855, to June 11, 1860, Ticket Agent, etc., in the general offices of the Milwaukee & Chicago Railway Co. (the Chicago & North Western Railway Co.); June 11, 1860, to June 1, 1869, General Accountant of the Michigan Southern & Northern Indiana Railroad Co.; July 11, 1861, to June 1, 1869, also General Ticket Agent same road (now part of the L. S. & M. S. Railroad system); June 1, 1869, to June 20, 1894, Auditor of the Lake Shore & Michigan Southern Railway Co. He was President of the Association of American Railway Accounting Officers, Treasurer of the Civil Engineers' Club of Cleveland, and enjoyed many other complimentary positions of this kind. During the World's Fair he attended and read a paper before the Statistical Congress, and was conspicuous upon the platform on Railroad Day as one of the handsomest and freshest looking of the quite eminent persons assembled there. The annual reports of the Michigan Southern & Northern Indiana Railroad, and of the Lake Shore & Michigan Southern Railway, which were prepared and edited by Mr. Leland for more than 30 years, will be a permanent monument to his diligence, and will continue of value to the statistician for a long time to come. They also reveal a characteristic which endeared Mr. Leland to his associates—his affectionate interest in the persons, and even the things (as the old locomotives and cars) with which he was associated. These reports contain unusual reminiscences of the early history of the road; tables showing the term of service of each of the directors and principal officers, with a column giving the dates of decease, in which his own name must now, alas, be entered. Mr. Leland was always in his office, always good-natured, seeming always happy and full of spirits. He was fond of jocose remarks, and enlivened the dull hours of business, or the social evening at the club, or an after-dinner speech, with quaint stories and felicitous hits which had no malice in them, so that he was relied upon, wherever he could be secured as a guest, as an invaluable aid to sober gayety. The Civil Engineers' Club, of Cleveland of which he early became a member, found its liberal constitution, which admits any in sympathy with its purposes, fully justified by the intelligent and active interest which he took in many of its discussions, and inall of its affairs. Mr. John Newell, President and General Manager of the great road with which he was so long connected, closes the circuar announcing Mr. Leland's death with this handsome and just eulogium: "He was pre-eminent among railway men as an accountant and a master of detail, and in the capacity of his mind and the scope of his work had few equals in this country. In his death the company loses a zealous, efficient and trusted officer, whose services have ever been most highly satisfactory to the management of the company."

ELECTIONS AND APPOINTMENTS.

Atlantic & Lake Superior.—At a special general meeting of the Company, held in Montreal this week, the following were elected directors: Senators Thibaudeau, Desjardins, Guevrement, Messrs. D. Bergin, M. P., A. F. Gault, Henry Hogan, A. Campbell, C. N. Armstrong, of Montreal, and A. R. Chisholm, of New York.

Burlington & Western.—The stockholders of the Burlington & Western and Burlington & Northwestern roads held their annual meetings in Burlington, Ia., on June 20. The following officers were elected by the Burlington & Western: President, T. W. Barhydt; Vice-President, C. P. Squires; Secretary-Treasurer, R. M. Green; Manager, Robert Law; Directors, T. W. Barhydt, C. P. Squires, H. B. Scott, J. W. Blythe, Lyman Cook, Directors of the Burlington & Northwestern: W. W. Baldwin, Lyman Cook, John T. Remey, H. C. Garrett, J. W. Blythe, T. W. Barhydt, Norman Eversman, C. P. Squires, H. B. Scott,

Canadian Pacific.—W. A. Grant, formerly Secretary to T. G. Shaughnessy, Vice-President of the Canadian Pacific Railroad, and latterly with the Niagara Falls Electric Railroad, has been appointed Assistant to the Vice-President of the Canadian Pacific.

Charleston, Clendennin & Sutton.—The stockholders of the railroad met at Charleston, W. Va., on June 19. C. C. Lewis, A. L. Ruffner, J. D. Barnes, Neil Robinson, I. Schwabe, W. F. Goshorn and W. W. Riley, of Charleston, and W. W. Drake and W. S. Drake, of Philadelphia, were elected directors. C. C. Lewis was elected President, and W. S. Drake Secretary and Treasurer.

Charleston, Clendennin & Sutton.—At a meeting of the stockholders of the railroad, held in Charleston W. Va., on June 1, the following Directors were elected: C. C. Lewis, A. L. Ruffner, J. D. Barnes, Neill Robinson, L. Schwabe, W. F. Goshorn, and W. W. Riley, of Charleston, W. Va., and W. W. Drake, and W. S. Drake, of Philadelphia, Pa. Subsequently C. C. Lewis was elected President, and W. S. Drake, Secretary and Treasurer. The Charleston directors represent the old interest in the road, and the Philadelphia directors the recently acquired interest which now controls the company.

Elkton & Southern.—Books for subscription to the capital stock of the railroad company were opened at Elkton, Md., last week, and sufficient stock subscribed for to justify organization. The following Directors were elected: George Biddle, Z. Porter Lusby, John J. Williams, George N. Bennett, John S. Wirt, Manly Drennen and Dr. Howard Bratton, of Elkton. Officers were elected for the ensuing year as follows: President, George Biddle, Cecilton, Md.; Treasurer, Emil Theilens, Philadelphia; Secretary, Howard Bratton.

Flint & Pere Marquette.—Capt. J. W. Martin has been appointed Superintendent of the water lines of the company, to succeed F. E. Parker, resigned.

Lehigh & Hudson River.—The office of Car Accountant is to be abolished on July 1. Frank T. Sayer has been appointed General Car Agent with office at Wawrick, N. Y. Mr. Sayer will have charge of the Car Record Department, and all reports of car mileage, and matters pertaining to the car service, should be addressed to him.

George B. Harris has been appointed Superintendent of Tracks, Bridges and Buildings.

Lehigh Valley.—J. F. Schaperkotter has been appointed General Agent of the company, in addition to his duties as Real Estate Agent, with headquarters in Philadelphia. Thomas W. Hulme has been appointed Real Estate Agent.

New York & New England.—T. W. Kennan has been appointed Superintendent of the Central Division, vice Mr. G. W. Offutt, resigned. His office will be at Providence, R. I.

Oregon Improvement Co.— The annual meeting was held in Portland, Ore., June 18, and the following Directors were elected: W. H. Starbuck, C. B. Tedcastle, Edwin S. Hooley, New York; F. H. Prince, Boston; C. A. Dolph, William M. Ladd, Henry Failing, Joseph Simon; C. H. Lewis, and Jonathan Bourne, Portland; C. J. Smith, Seattle. The following officers were elected; President, W. H. Starbuck; Vice-President, C. A. Dolph; Secretary, N. Poston.

Savannah, Florida & Western.—The circular appointing Mr. William Rutherford Superintendent of Motive Power and Equipment of the Railroads of the Plant System, defines his jurisdiction as follows: The maintenance, repairs, design and construction of locomotives, cars, tools and machinery will be under his direction, and the Master Mechanics or Foremen at the several shops will be subject to his direction. He will have such supervision of the enginemen and firemen, while on the roads, as may be necessary to a proper performance of their duties. He must see that all motive power called for by the superintendents of the respective roads for the movement of trains is promptly furnished. He will, under the direction of the President, distribute the different classes of motive power as he may think best adapted to the requirements of the different roads to which the same may be assigned, and in order to render the most efficient and economical service in the movement of trains. Mr. Rutherford's headquarters will be at Savannah, Ga. He was formerly Master Mechanic of the Florida Southern road.

A circular has been issued announcing the consolidation of all the accounting departments of the several roads comprising the Plant system, with headquarters in Savannah, after July 1. C. T. Morel, formerly General Accountant, has been appointed Comptroller; R. S. McIver, Auditor of the Brunswick & Western, has been appointed Auditor of Receipts of the entire system, and H. H. McKee, Auditor of the Savannah, Florida & Western, has been appointed Auditor of Disbursements of the system.

Valley (Ohio).—Judge Ricks has appointed N. Monsarrat to the receivership of the railroad to fill the vacancy caused by the recent death of J. K. Bole. Mr. Monsarrat was formerly Vice-President of the Cleveland, Akron & Columbus Railroad.

RAILROAD CONSTRUCTION, Incorporations, Surveys, Etc.

Bangor & Aroostook.—Malcom & Ross have taken the contract to grade the Fort Fairfield branch of the railroad and have begun work on the line. The Fort Fairfield branch is 13 miles long, leaving the main line at Presque Isle, and extending northeast to Fort Fairfield, 13 miles.

Blaine & Eastern.—M. J. Henry, of New Whatcom, Wash., the contractor for this road from Blaine to Nooksack City, Wash., thence connecting with the Seattle, Lake Shore & Eastern, has had nearly 300 men on the grading for some weeks.

Brazos & Burleson.—A preliminary survey for this road in Texas is now being made by Professor J. C.

Nagle, of the Texas Agricultural & Mechanical College, with a number of the students in the civil engineers' course as his assistants. The railroad is projected by H. K. White and others, of Bryan, who are interested in the property along the Brazos Valley. The route is from Clay Station, on the Gulf, Colorado & Santa Fe, to the terminus of the Hearne & Brazos Valley Road at Stone City, Tex., and is about 22 miles long through a level country.

Charleston, Clendennin & Sutton.—Prior to a meeting of the stockholders of this company held at Charleston, W. Va., on June 21, 2,500 shares of the capital stock of the company were sold to Philadelphia and Pittsburg parties, represented by Messrs. W. W. Drake and W. S. Drake. This transferred a controlling interest in the road. All the floating indebtedness, amounting to about $40,000, was paid off. At the meeting all but two of the directors were chosen from among the old stockholders, the desire being that the road should retain its local character. The company now has engineers at work on the proposed extension from Clendennin to Sutton, W. Va., and they are being followed up by attorneys who are taking up the right of way.

Chicago, Burlington & Quincy.—The track has been laid on the Montana extension to the town of Pass, 25 miles from Sheridan, Wyo., which is 10 miles south of Alger, the former terminus of the Wyoming line. Sixty subcontractors, who employ 2,000 men, are engaged on the work. Kilpatrick Bros., the contractors, believe that the junction with the Northern Pacific at Billings, Mont., will be made by December next. The distance is over 120 miles from Alger.

Choctaw Coal & Railway Co.—The construction of the Middle section of this road between South McAlester and Oklahoma City, has been carefully provided for in the several reorganization plans for this property which have been issued from time to time. In the plan now proposed, the greater part of the proceeds of a new issue of bonds will be used to complete the line. It is stated in the reorganization plan that "The completion of the road between South McAlester and Oklahoma City will give immediate access, not merely to additional markets in the South and West, but upon the lines of the Atchison & Rock Island Roads in Kansas and Texas, and will also secure a large traffic for lumber, which is abundant in the section of country reached by the eastern end of the line, while that to the west is entirely bare of timber."

Cleveland & Elyria.—This Company was incorporated at Columbus, O., last week with a paid-in capital of $100,000 for the purpose of constructing a railroad from Cleveland, to Elyria, Ohio. The incorporators are Benjamin F. Phinney, Jay Comstock, J. M. Gasser, H. D. Coffinberry, and Dallas Beebe, of Cleveland. The road is to run almost directly south to Phinney's Corners, and thence west to Elyria following the old Rocky river, and Cleveland and Elyria roadways.

Dayton Union.—The plans of this company, recently organized, include the construction of a new Union station at Dayton, O., to cost about $100,000, and other improvements to the terminal facilities of the railroad in that city which will amount in the aggregate to about $600,000. The Cincinnati, Hamilton & Dayton, the Pennsylvania and the Cleveland, Cincinnati, Chicago & St. Louis, are interested in the organization of the company. It is proposed, among other improvements, to elevate the tracks of these companies above grade for about three-quarters of a mile through the city, from the Miami Bridge to Wayne avenue.

Eastern Nebraska & Gulf.—The bill granting the road right of way across the Winnebago and Omaha Indian reservations which passed the United States Senate some time ago has passed the House. W. C. McNamara, of Sioux City, General Manager of the company, states that the projectors have expended about $8,000 on this road so far in making surveys, and now have a line located from Sioux City to a point 50 miles to the southwest. F. W. Kimball, of Austin, Minn., is Chief Engineer of the company.

Elkton & Southern.—The organization of this company has been completed. George Biddle, of Cecilton, Md., is President, and Dr. Howard Bratton, of Elkton, Md., is Secretary. It is the purpose of the projectors to consolidate the Baltimore & Delaware Bay and Easton & Chestertown Roads with the Elkton & Southern, to be known as the Peninsula Railroad Co., and a certificate of incorporation will be issued soon to the new company. The Elkton & Southern is to connect with the Baltimore & Ohio at Childs Station, and connect at Lambson's Station with the Baltimore & Delaware Bay Railroad, which will be rebuilt and which will be made to extend to Tolchester, on Chesapeake Bay, thus forming a line down the Maryland Peninsula. Extensive improvements will also be made at Bombay Hook, where the cars are to be transferred to the Jersey Central. Certain traffic arrangements have been made with the Baltimore & Ohio and with the Jersey Central.

Florence & Cripple Creek.—J. B. Orman, one of the contractors on this line to Cripple Creek, reports that the end of track is now at Victor, a few miles from the town of Cripple Creek. The heavy rains in the last few weeks have done some damage to the railroad through the cañon, but this is now nearly all repaired. The rails have been delivered to complete the line into Cripple Creek, and this work is now being carried on.

La Porte, Houston & Northern.—Superintendent C. W. Nelson states that there remains only 4½ miles of track to complete the line through from Harrisburg to La Porte, Tex., 17 miles. J. F. Allen, of La Porte, is completing the road.

Midland Terminal.—The railroad is now completed to the town of Gillett, which is only 2½ miles north of Cripple Creek, Col. The company will begin immediately to operate the line into Gillett, where many of the important mines of the Cripple district are reached. Through trains will probably be run from Denver, making the trip to Gillett in five hours.

Montford Colonizatian.—A deputation consisting of Mr. E. Senecal, President of the company; Ald. Brunet, Vice-President, Senator Tasse, and others, at Ottawa, last week, urged upon Hon. John Haggart, Dominion Minister of Railways, the claim of the railroad to a subsidy for the portion of the road from Montford to Arundel, Que. Twenty-one miles of the road are built. Hon. Mr. Haggart said that he could not make any promise, but that the road appeared to be fairly entitled to a subsidy, and if any subsidies at all were granted this year, the company would doubtless be included.

National Tehauntepec.—The last spike on the southern division of this road was driven at La Puerta, on the Jumuapa river, 148 kilometers from Salina Cruz, on June 13. It was thought that the road would be completed and the two sections joined by June 27, and the railroad across the Mexican Republic opened to traffic on July 1 from ocean to ocean. The road is 309 kilometers, or about 192 miles, in length. The first concession for this railroad was granted 40 years ago, the *Mexican Financier* says, and various companies undertook, from time to time, to build it. The credit of having carried through to completion this all-important work is due to the Hon. Chandos S. Stanhope, whose energy, perseverance and ability surmounted all difficulties. In spite of offers by parties interested in inter-oceanic traffic to complete the road, if the privilege of operating it for a long number of years was granted, the Mexican Government preferred to make sacrifices to complete the road and retain the control in its own hands.

New Roads.—The Mexican Government some time ago granted to Messrs. E. Gonzales, Trevino and J. A. Robertson, a charter to build a railroad from the Monterey & Mexican Gulf Station in Monterey, Mex., to the San Pablo mines. The engineers are now making the survey, and by July they will be ready to break ground.

Orford Mountain.—The plans for the extension of this road to Richmond, Que., have been revived, and it is proposed to build the extension this year. The proprietors of this road are now taking steps to this end, and work will soon begin. The road is at present completed from the Canadian Pacific, at Eastman, Que., to Kingsbury, Que., 26 miles, and the extension to Richmond is north from Kingsbury. S. W. Foster, of Montreal, is General Manager of the company.

Pecos Valley.—J. R. Hughes, of Fort Worth, Tex., reports that the work of extending the road from Eddy north to Roswell, N. Mex., a distance of 90 miles, is progressing steadily, and that 30 miles of grade have been completed out from Eddy, and nearly two miles of track laid and ready for operation. Forty miles of ties and track are on the ground awaiting distribution along the line. The Pecos Valley is now operating 90 miles of road, running from Pecos to Eddy, and by Fall expects to have the extension finished and the road from Pecos to Roswell in operation.

Pennsylvania Midland.—The charter for this company has been filed in Pennsylvania. It is to be distinguished from a company of the same name, formed only last week by the consolidation of a number of short lines in Bedford County. This later charter provides for a road from Harrisburg to Portland, Northampton county, through Dauphin, Lebanon, Berks, Lehigh and Northampton, the route of the old South Mountain Railroad, the franchises and rights of which have been purchased by the present incorporators from J. March, Jr. The line is 130 miles long, and the capital is $2,500,000. The officers are G. G. Williams, Philadelphia, President; Directors, Philip William Avirett, Cumberland, Md.; James March, Jr., and James T. Harbin, Hagerstown, Md.; Evan M. Callihan, T. P. Light and J. March, Sr., Lebanon, Pa.

Powellton & Pocahontas.—The railroad of this company now in operation is seven miles in length, and extends from Mount Carbon (C. & O. R. R. Junction) to Powellton, W. Va., five miles, and from there to the mines, two miles. An extension of 1½ miles will be finished by July 15, in all 8½ miles. It is intended to connect this road with the Norfolk & Western about Elkhorn, W. Va., 56 miles. Two tunnels will be necessary on this extension, one of about 3,600 feet. This tunnel will go through a coal seam seven feet in thickness. It may be several years before this work is taken up. The officers of the company are as follows: Evan Powell, President; D. T. Evans, Superintendent, and C. Scholz, Engineer, all of Powellton, W. Va.

South Jersey.—The first through train on the road from Philadelphia to Cape May, N. J., was run on June 23. The train was in two sections of 11 cars and 7 cars each. It carried over 600 passengers, nearly all business men of Philadelphia, who had been invited by the company to make the excursion over the line to Cape May. Regular through trains will begin running on June 30.

Southern Pacific.—Resident Engineer E. B. Cushing is now surveying the proposed extension of the branch line from St. Martinville to Arnaudville, La. It is expected to begin constructing the road as soon as the right of way is secured.

Tionesta Valley.—The proposed northern extension from Sheffield, Pa., referred to last week, is not to be built as far as Warren, as there stated. The line will be extended only to Clarendon, Pa., six miles from Warren. The location is being completed between Tiona and Clarendon this week, and by July 2, 100 men will be at work constructing the link required to connect the Tionesta Valley with the Warren & Farnsworth Railroad, both of which roads now belong to the United States Leather Co. The company is doing its own work, and no contracts of any kind will be let on any of the work. F. F. Whittekin, of Tionesta, Pa., is engineer in charge.

Troy & New England.—About one half of the amount, $50,000, required to be subscribed by Contractor White, for commencing the construction of this road east of Troy to Sand Lake, N. Y., 10 miles, has been secured. It is expected that the full amount will be raised very soon. Walter P. Warren, of Troy, N. Y., is President.

Washington Southern.—Henry & Balch, of Seattle, Wash., who are the contractors building the cut-off in Mason county, Wash., have a mile and a half of the road out of Shelton completed, and grading on other portions is well along. By the time the bridges can be completed the rest of the road will be ready for the rails. It is expected to have the six-mile extension fully completed by July 10.

Wiscasset & Quebec.—There has been a general overturning made in the affairs of this railroad. Hon. George H. Crosby, to whose untiring interest in the road up to now its present success is due, has resigned as President and Manager. The new President is R. T. Rundlett, of Wiscassett, Me.; General Manager, Fred. P. Fogg; Treasurer, W. D. Patterson. Mr. Crosby continues as Director. His retirement is because of physical inability to bear the weight upon him as chief in the undertaking. Some uneasiness has been felt because his attitude has not been understood. Of the $300,000 capital stock subscribed, $100,000 was pledged by Mr. Crosby. Last week he paid his first assessment of $15,000. The new Directors are thoroughly in harmony. At present 500 men are at work along the line of the road north of Wiscasset, and the contractors, Rowe & Hall, of Boston, will, it is said, at once largely increase this force.

Wyoming & Pierre.—The contract reported let to C. D. Crouch, of Deadwood, S. D., for the construction of a new railroad from what are known as the Hay Creek coal fields, in Crook County, Wyo., to connect with the Burlington & Missouri River Road at Minnesala, S. D., is to be built by this company, in which Underwood & Young, of New York, now hold a controlling interest. The mines referred to have been the property of ex-Governor Larrabee, of Iowa, but it is announced that his interest and that of his associates has been recently sold to Underwood & Young, who are to undertake the development of the coal fields. George M. Mix, of Minnesala, S. D., is the local manager of the railroad.

GENERAL RAILROAD NEWS.

Atchison, Topeka & Santa Fe.—The earnings and expenses of the railroad, for the month of April, 1894, and for the ten months to April 30, 1894, as compared with the same period of 1893, are given in the following table:—

Month of April.	1894.	1893.	Dec.
Operated mileage	7,457	7,480	23
Gross earn	$2,661,859	$3,216,084	$554,225
Oper. expen	2,255,597	2,337,135	81,538
Net earn	$406,262	$878,949	$472,687
Ten months to April 30.			
Gross earn	$29,571,161	$34,417,803	$4,846,642
Oper. expen	21,211,028	24,145,111	2,934,083
Net earn	$8,360,133	$10,272,692	$1,912,559
GENERAL SYSTEM.			
Month of April.			
Operated mileage	9,321	9,344	23
Gross earn	3,272,923	$3,912,176	$639,253
Oper. expen	2,711,295	2,793,545	82,250
Net earn	$561,628	$1,118,631	$557,003
Ten months to April 30.			
Gross earn	$36,182,406	$42,327,923	$6,145,517
Oper. expen	25,789,553	29,207,123	3,417,570
Net earn	$10,392,853	$13,120,800	$2,727,947

Carolina Central—The Railroad Company has decided to default on the interest due July 1, on $2,250,000 of its first mortgage because of the large and unexpected cash expenditures that, according to the management, have been necessary to put the property in a condition to be operated safely and economically. A meeting of the bondholders is to be held in Baltimore on June 30 to determine what action should be taken to protect their interests.

Chautauqua Lake.—The foreclosure sale of this property in the interest of the Mercantile Trust Co., of New York, will occur at Mayville, N. Y., on July 5, E. R. Bootey, of Jamestown, being the referee. The railroad has been operated by a receiver since 1890, and is about 22 miles long, extending from Jamestown to Mayville, N. Y., along the east side of Chautauqua Lake.

Choctaw Coal and Railway Co.—A new plan for the reorganization of the company has been agreed upon. It calls for the creation of $1,000,000 25 year six per cent. first mortgage; $5,500,00 25 year five per cent. general mortgage, and $1,100,000 five per cent. income gold bonds, interest payable only when earned. The indebtedness of the company is about $2,214,000, and that of the receivership $1,000,000. The holder of a note of $1,000 of the company on subscribing in cash $333.33 and surrendering the note with collateral, will receive $1,370.30 general mortgage bonds and $250 income bonds The holder of 100 shares of stock upon subscribing in cash $1,000, will receive $1,111.11 general mortgage bonds and negotiable certificates of interest in voting trust of $5,000. After paying off the indebtedness and cost of reorganization, it is estimated the company will have left available $1,400,000 in cash, $632,000 general mortgage bonds and 6,123 income gold bonds. The creditors' contribution of 33⅓ per cent. of their claims in cash; that of stockholders of $10 per share, and the sale of the $1,000,000 prior lien bonds will provide $2,488,000 cash to pay the receivership indebtedness, and also construct and equip the new line between South McAlester and Oklahoma City. The general mortgage bonds are to be issued for the cash subscriptions and assessments, and with the income bonds, will be issued also to the creditors and shareholders in various proportions to represent their respective interests. This plan has been accepted by some of the largest creditors in Philadelphia, and the chief creditor, the Wilbur Trust Co., is expected to give its consent.

Cleveland, Cincinnati, Chicago & St. Louis.—Messrs. Drexel Morgan & Co. and Vermilye & Co., offer for subscription at 90 $600,000 of St. Louis Division first collateral trust mortgage, four per cent. bonds, due 1990. These bonds are the remainder of an issue of $10,000,000 on the St. Louis Division extending from Terre Haute, Ind., to East St. Louis, Ill., and will be secured by an absolute first mortgage on the property mentioned, after July 1.

Kansas Pacific.—An agreement has been prepared in behalf of the consolidated mortgage bondholders for the protection of their interests, and filed with the Continental Trust Co., by a committee consisting of Silas B. Dutcher and William A. Nash, of Brooklyn, and Henry N. Whitney, Otto T. Bannard, and T. W. Myers, of New York. The Committee is authorized to foreclose the mortgage, also to appear before any committees of Congress in any matter affecting the interests of the signers. The Committee may make any settlement or arrangement which does not involve a reduction in the principle or interest of the bonds.

Lake Shore & Michigan Southern.——Following is the report of earnings for the six months ending June 30:

	1894.	1893.	Dec.
Gross earn	$9,382,241	$11,816,580	$2,434,339
Oper. expen. and taxes	6,183,826	8,378,670	2,194,844
Net earn	$3,198,415	$3,437,910	$239,495
Fixed charges	1,680,000	1,680,000	
Bal. to stock	$1,518,415	$1,757,910	$239,495
Dividend	1,483,995	1,483,995	
Surplus	$34,420	$273,915	$239,495

The profits this year are equal to 3.07 per cent. upon the stock, as against 3.55 per cent. last year.

Manhattan (Elevated).—Judge Ingraham, in Supreme Court at New York, has signed an order modifying the injunction obtained by the city of New York, last February, which restrained the Company from laying a third track on Ninth avenue in places where the plans had not been approved by the old Rapid Transit Commission acting under a law of 1875, whose present members are Winslow Pierce, Manghan Carter, Sutherland and Tenny. The approval of this Commission upon additional plans has been obtained, and under the order entered the Manhattan Company is authorized to construct and operate a third track between Gansevoort and Eighty-third streets. This additional track will be used for express trains. The third track is now built above Twenty-sixth street. The city began suit last December to prevent the company proceeding with this third track work, and the injunction was

issued. Then the railroad company announced that it was acting under authority granted by a forgotten Commission. The continuous third track will be in operation during November. It is now completed below Fifty-ninth street, and from Ganzevoort, below Twelfth street, to above Twenty-sixth street.

Michigan Central.—The regular semi-annual dividend of two per cent. was declared this week upon the following financial report for the six months ending June 30.

	1894.	1893.	Dec.
Gross earn	$6,169,000	$7,550,000	$1,381,000
Oper. expen.	4,429,000	5,785,000	1,356,000
Net earn	$1,740,000	$1,765,000	$25,000
Fixed charges	1,200,000	1,200,000	
Surplus	$540,000	$565,000	$25,000
C. S. prop	152,000	162,000	10,000
M. C. prop	388,000	403,000	15,000
Dividend	374,764	374,764	
Balance	13,236	28,236	15,000

The Canada Southern has declared a semi-annual dividend of 1½ per cent., payable August 1. Its operations are included in the Michigan Central statement printed above, which shows its proportion of the profits, after paying fixed charges, to have been $152,000. The company brought forward a balance from the previous year of $190,599, making the total balance on June 30, $342,599. The dividend declared to-day calls for the disbursement of $187,500, leaving a balance of $155,099.

New York Central & Hudson River.—The following table gives the earnings and expenses of this company for the three months ending June 30, 1894, and for the year ending June 30, 1894, as compared with the same period of 1893, the earnings for 1893 being actual, and those for 1894 being estimated.

Three mos. to June 3d.	1894.	1893.	Inc. or Dec.
Miles operated	2,395	2,096	I 299
Gross earn	$10,078,000	$11,963,953	D $1,885,953
Oper. expen.	7,026,000	8,250,443	D 1,224,443
Net earn	$3,052,000	$3,713,510	D $661,510
First charges	2,600,000	2,565,388	I 34,612
Profit	$452,000	$1,148,122	D $698,122
Dividend	1,180,000	1,117,853	I 62,147
Surplus (def.)	$728,000	$30,269	D $758,269
Year to June 3d.			
Gross earn	$43,840,000	$46,936,693	D $3,096,693
Oper. expen.	29,619,000	32,291,876	D 2,672,876
Net earn.	$14,221,000	$14,644,817	D $423,817
First charges.	10,342,000	10,085,630	I 256,370
Profit	$3,879,000	$4,559,187	D $680,187
Dividends	4,590,000	4,471,415	I 118,585
Surplus (def.)	$711,000	$87,772	D $798,772

New York, Lake Erie & Western.—Judge Ingraham of the Supreme Court at New York has denied the application of John J. Emery for an injunction against the recording of the new mortgage for $70,000,000 provided for in the plan for the reorganization of the Company and the issue of bonds under the mortgage. In his opinion Judge Ingraham reviews at length the points raised in his petition by the plaintiff, and says: While it is clear that there are certain obligations resting upon the majority, to refrain from infringing the legal right of the minority, and that a court of equity will enforce and protect the rights of the minority, still, when the holder of a very small number of bonds or shares of stock seeks to enjoin a very large majority from carrying out a plan such majority deem to be for their benefit, I think the Court should not interfere unless it plainly appears that some legal right of the minority is endangered. The new mortgage on its face does not affect the right of any bondholder secured by the old mortgage.

Old Colony Steamboat Co.—The company has passed its July dividend. It paid $9 last year, $5 in July and $4 last January, but previous to this has paid 10 per cent. per annum. The stock of this company is practically all owned by the Old Colony railroad, there being, it is believed, but 50 odd shares in the hands of individuals. The capital is $1,200,000. The expenses of building the boat Priscilla is the chief cause for passing the dividend.

Oregon Railway & Navigation Co.—An order was issued by the United States District Court in Portland, Ore., this week, granting the application for a separate receiver for the Oregon Railway & Navigation Company. E. McNeill was appointed Receiver. Although this action separates the interests of the Oregon Navigation Company and the Union Pacific Railroad, it is not believed that there will be any friction between the two companies.

Sioux City Terminal.—Judge Shiras, of the United States Court, at Sioux City, has refused to grant the first mortgage trustees a new receiver for the Company, but has appointed C. L. Joy, of Sioux City, collector of rentals and profits, with power to make leases, except railroad leases, which latter will require the concurrence of all creditors. Judge Warwick Hough, of St. Louis, is Receiver, and a new appointment was resisted by the creditors.

Union Pacific.—Ex-Gov. Evans, of Denver, Col., has transfered his suits against the Union Pacific Railroad Company to New York, where he has brought suit in the Supreme Court in behalf of himself and other stockholders of the Union Pacific, Denver & Gulf Railway Company against the Union Pacific, its receivers, and others. Ex-Gov. Evans asks for an accounting from the Union Pacific for certain bonds and stocks of the Union Pacific, Denver & Gulf, and an injunction restraining the defendants from selling or disposing of the securities enumerated.

TRAFFIC.

Traffic Notes.

The merchants of Charleston, S. C., are preparing to establish a freight bureau.

Two ticket brokers have been arrested at St. Paul, under the anti-scalper law of that State.

The Kansas State Railroad Commissioners, on a petition from Salina, have ordered a reduction in the rates on coal over various railroads to that city. It is said that from Southeastern Kansas mines the rate has been ordered reduced from $2 to $1.50 a ton.

It is announced in the Philadelphia papers that the Pennsylvania Railroad will hereafter run a special express train from Philadelphia to New York on Wednesdays, to connect with the European steamships of the International (American) Line, which hereafter will leave New York at 11 a. m., regardless of tides.

The extent of the depression in business on account of the recent coal strike may be partially understood from the statement of the Cleveland Car Service Association for May, which has just been issued, and which shows that the total number of cars handled by that association, which includes Akron and several other towns, was 23,000, whereas in the same month of 1893 it was 34,000.

The Fitchburg Railroad recently took East, through North Adams, a train load of salt, consisting of 57 cars containing about 1,000 tons. The salt was nearly all in small packages, for retailers, and the selling agent took a large party of wholesale grocers on an excursion from Boston to North Adams, where they took dinner and looked at the outsides of the freight cars, which were decorated with banners.

The Philadelphia & Reading has made important reductions in commutation and round trip tickets between Philadelphia and the stations within a short distance of that city. Sixty-trip monthly tickets are reduced from $4.65 to $3.15. This reduction is made partly on account of the extension of electric street car lines, and the fare to and from points as far out as Nicetown is the same as that on the street cars. The road has also established a "belt line" train service to run on Sundays every 15 minutes from the Terminal at Market street to West Falls via Ninth street, and returning via Pennsylvania avenue.

Chicago Traffic Matters.

CHICAGO, June 27, 1894.

A meeting of the Executive Committee operating the immigrant clearing house agreement of the Western lines was held last week, at which the request of the Chicago Great Western to be allowed an increased percentage was considered.

A meeting of the Executive Board of the new Western Trunk Line Association will be held this week to consider such matters as may be presented by the sub-associations.

It is reported that the Elgin, Joliet & Eastern, known as the Outer Belt Line, has made arrangements to enter the Dearborn Station over the tracks of the Monon and Western Indiana, and become a competitor for suburban passenger traffic.

The Northern Pacific and the Great Northern want the association lines to authorize a choice of routes between Chicago and St. Paul on return portions of excursion tickets to Eastern points, which the association refuses to do.

Representatives of the Chicago Live Stock Exchange are protesting vigorously against the intention of the roads to make a charge of $2 a car for switching at the yards. A committee from the exchange appeared before the managers of the roads last week and endeavored to have the obnoxious order rescinded, claiming that unless this was done many of the members of the exchange would be forced out of the business. The railroads declared that they were not responsible for the action, which had been forced upon them by the demands of the Union Stock Yards Co., of the $2 charge, which the roads could not afford to absorb. The Chicago east-bound roads have taken similar action, and at a joint conference with the Western roads it was decided that the switching charges should become effective July 9. The Eastern roads are in favor of making the charge $3 a car at Hammond, and have so agreed with the Western roads. The roads claim that the policy of the Union Stock Yards Co. is detrimental to the interests of the Exchange, and is forcing business away from Chicago to more favorable localities.

The result of the Lake Erie & Western rate from Indianapolis to Denver, noted last week, was the making of a rate of $19.75 from Chicago by the Atchison, which was met by the association lines. This is taken as an indication that the Atchison proposes to meet any reduced rates made, but will not attempt to reduce rates generally, unless the provocation is greater than now exists.

The Cincinnati, Hamilton & Dayton applied the St. Louis basis, as made by the Atchison reduction, to its tickets via Chicago, thus in effect reducing the rate from Chicago to Denver to $17.75. This caused considerable bad feeling among the other Cincinnati-Chicago lines, and gave rise to a suspicion that some Western connection assisted in the matter. It is such actions as these that keep the lines in constant commotion.

Managers of what are known as the Peoria lines met last week and made some progress toward the inclusion of that city in an agreement similar to that now in operation from Chicago on east-bound freight. It is conceded that the success of the Chicago agreement will not be assured until all the other gateways are included in a similar arrangement. Some progress was made toward bringing this about, but the meeting adjourned without having definitely settled upon the percentages to be applied. Central Traffic officials are hopeful, however, that this will be accomplished in the near future.

Western lines have decided to take no further steps to secure harmony in lake and rail rates, and the St. Paul-Chicago lines have withdrawn all tariffs in connection with the lake lines. For the balance of the season they will insist upon their full local of 12½ cents on flour and flour products from St. Paul and Minneapolis to Chicago. This step was determined upon when it was definitely known that the Trunk Lines would not co-operate in forcing the lake and rail lines to maintain the established 5 cents differential under all-rail rates. It will be remembered that last year an agreement was entered into whereby the Commissioners of the Central Traffic and Western Freight Associations were given authority to meet any rates made by the lake and rail lines. This the Trunk Lines now claim to have been only a temporary arrangement, and one which they will not longer recognize. A proposition was made to the Western lines by the lake lines that they accept from St. Paul one-third of the lake and rail rate, but this was rejected on the ground that it would reduce their proportion to approximately 2½ cents per 100 pounds, whereas under the agreement they were entitled to 5 cents. The result of this action of the Western lines will undoubtedly be that they will receive more revenue on such of the business as they can control from interior points and locally to Chicago, than they would if they took what they could get by meeting the lake rates. The Central Traffic lines will be the chief sufferers, as under this arrangement the Western lines cannot expect to deliver a pound of competitive flour to them which can take advantage of the lake rates from Minneapolis and Duluth. One of the reasons urged by the lake and rail lines to the Trunk lines why they should not maintain the 5-cent differential was that a large number of contracts stood in the way; nevertheless they subsequently advanced the lake and rail rate from Minneapolis to 22½ cents per 100 pounds, 7½ cents above the Chicago rate. It is claimed, however, that this rate is only a paper rate, and that the traffic is being moved on approximately a 17½-cent basis from Minneapolis.

As a sequel to the reductions made for the Republican League Convention at Denver, the Missouri Pacific, Wabash and Burlington charge the Alton with having made a secret arrangement with the St. Louis Turners for a rate of $22.50 between St. Louis and Denver for their annual meeting next month. The Alton claims that no contract has been made, and that the trouble is that the Turners supposed they would receive the same consideration that had been shown to other bodies, and announced the rate before any had been granted them.

Soo Line officials are protesting vigorously because the Western lines refuse to recognize its rates, claiming that it has been trying for some time to bring about a conference to adjust all difficulties. All of which causes a broad smile among Western passenger men.

Passenger representatives of lines initial at Indianapolis are in session to-day, perfecting an agreement to govern east-bound business similar to that now in operation at Cincinnati.

The shipments of east-bound freight, not including live stock, from Chicago by all the lines for the week ending June 23, amounted to 44,599 tons, against 45,861 tons during the preceding week, a decrease of 262 tons, and against 55,246 tons for the corresponding week last year. The proportions carried by each road were:—

Roads.	W'k to June 23.		W'k to June 16.	
	Tons.	P. c.	Tons.	P.c.
Michigan Central	4,282	9.6	5,022	11.0
Wabash	3,903	8.7	3,973	8.7
Lake Shore & Mich. South	6,231	14.0	6,375	13.9
Pitts., Ft. Wayne & Chicago	4,630	10.4	4,510	9.8
Pitts., Cin., Chicago & St. L.	6,414	14.4	6,237	13.6
Baltimore & Ohio	2,627	5.9	2,470	5.4
Chicago & Grand Trunk	3,550	7.9	4,014	8.7
New York, Chic. & St. Louis	5,421	12 2	5,062	11.0
Chicago & Erie	5,242	11 8	5,328	11.6
C. C. C. & St. Louis	2,293	5.1	2,900	6.3
Totals	44,599	100.0	45,861	100.0

Lake lines carried 43,442 tons, against 52,524 tons last week.

Other Chicago traffic news will be found on page 466.

Interstate Commerce Commission.

The decision issued on May 29 in the case of the Freight Bureaus of Cincinnati and Chicago, against the southern railroads, for discrimination against Cincinnati and Chicago, and in favor of New York on freight rates to the South, was briefly noticed in the *Railroad Gazette* of June 8. The full decision has just been issued, and it is summarized in the head notes as follows:

1. If railway companies engaged in the transportation of traffic from one territory voluntarily enter into an association with railway companies engaged in the transportation of similar traffic from another territory to a common market, for the purpose, among others, of a mutual adjustment of rates over their respective lines, and in pursuance of this purpose as members of such association agree to and maintain rates over their own lines higher than are reasonable and the relation thus established between the rates from the two territories, respectively, is unjustly prejudicial to the former and unduly preferential to the latter, this is a violation of the first paragraph of section 3 of the Act to Regulate Commerce, for which, whether or not there be a joint liability under said Act of the two systems of carriers, there is at least a several liability on the part of those serving the territory injuriously affected.

2. Where the reasonableness of rates is in question, comparison thereof may be made, not only with rates on another line of the same carrier, but also with those on the lines of other and distinct carriers—the value of the comparison being dependent in all cases upon the *degree* of similarity of the circumstances and conditions attending the transportation for which the rates compared are charged.

3. The influence of water competition *via* the Atlantic on rail rates from northeastern cities to southern territory is not so great, as appears by the proof in these cases, as to account for or justify the difference between the mileage rates from those cities and the mileage rates from Chicago and Cincinnati to such territory under the rates complained of, and the fact of that influence on rates from the former cities cannot be invoked as a justification of rates from the latter, which, after due allowance for such influence as a substantially dissimilar circumstance, still appear on comparison of the two sets of rates to be *unduly* preferential to the former and *unjustly* discriminative against the latter. In rates from different territories to a common market, "relative equality is necessary in the *degree* of the similarity" of circumstances and conditions attending the transportation in the two cases.

4. The fact which is made to appear in these cases, that rates on traffic of the numbered classes from Chicago and Cincinnati to Southern territory are made *higher* than they otherwise would be, for the purpose of securing to the lines from northeastern cities the transportation of that traffic from the territory set apart to them under the Southern Railway & Steamship Association Agreement, itself raises a prima facie presumption of the unreasonableness of those rates.

5. Each locality competing with others in a common market is entitled to reasonable and just rates at the hands of the carriers serving it, and to the benefit of all its natural advantages, and no departure from the rule requiring rates in all cases to be reasonable in themselves can be justified on the ground that it is necessary in order to maintain existing trade relations, or to "protect competing markets," or to "equalize commercial conditions," or to secure to carriers traffic from certain territory assumed to be exclusively theirs.

6. The division of territory betwen the eastern and western lines provided for in the Southern Railway & Steamship Association Agreement, is without warrant in law and appears to be made for the benefit of the carriers without regard to the interests of shippers in the territory so divided, to whom it is in effect a denial of the privilege of shipping their goods or produce to market by the line or route they may prefer.

7. The "fines" or "penalties" imposed by the provisions of the agreement of the Southern Railway & Steamship Association on members for violation of association rules appear on the face of that agreement to be available as substitutes for payments which would be exacted under a regular pooling system, and the arrangement under which they are imposed is tantamount to a combination, contract or agreement "for the pooling of freights of different and competing railroads, or to divide between them the aggregate or net proceeds of the earnings of such railroads or any portion thereof," which are forbidden by the Statute.

8. The requirement of the agreement of the Southern Railway & Steamship Association that its members apply "full local rates upon all traffic subject to the Association Agreement coming from or going to" connecting lines which do not maintain Association rates, while to traffic from other connecting lines conforming to such rates full local rates are not applied, is repugnant to that clause of Sec. 3 of the Act to Regulate Commerce which forbids carriers to "discriminate in their rates and charges between connecting lines."